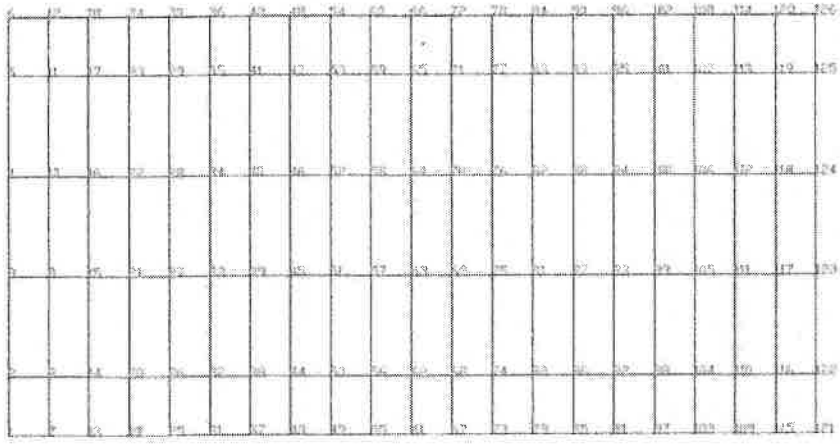
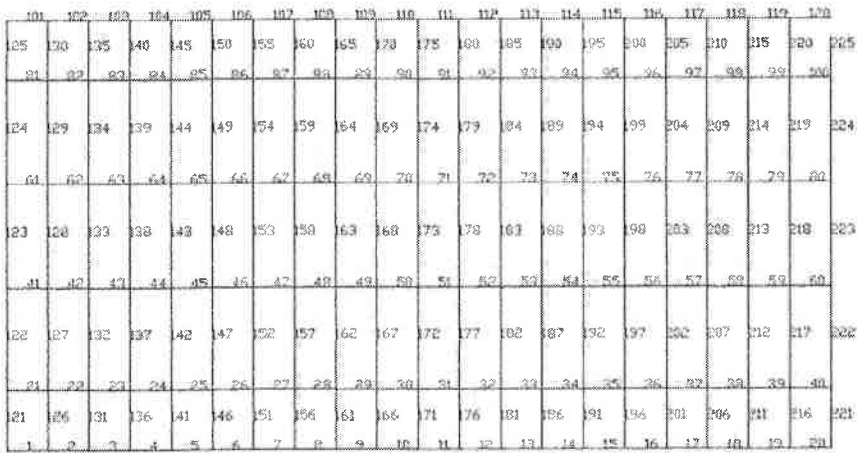
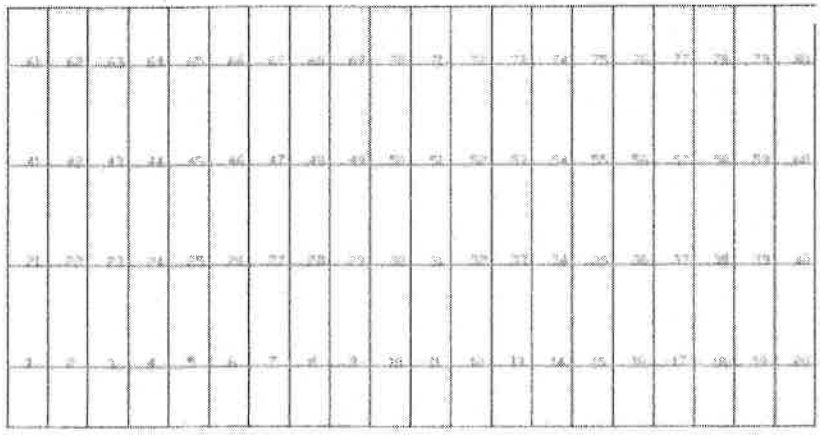
CROQUIS DE NUMERACIÓN DE NUDOS



CROQUIS DE NUMERACIÓN DE BARRAS



CROQUIS DE NUMERACIÓN DE TRAMOS



Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

Innova P... Ing. Antonio N. Pangrazio
Dirección de Fiscalización

Datos del Emparrillado

Datos de Nudos

Nudo	X (m)	Y (m)
1	0.000	0.000
2	-0.000	1.400
3	-0.000	3.800
4	-0.000	6.200
5	-0.000	8.600
6	-0.000	10.000
7	0.967	0.000
8	0.967	1.400
9	0.967	3.800
10	0.967	6.200
11	0.967	8.600
12	0.967	10.000
13	1.935	0.000
14	1.935	1.400
15	1.935	3.800
16	1.935	6.200
17	1.935	8.600
18	1.935	10.000
19	2.902	0.000
20	2.902	1.400
21	2.902	3.800
22	2.902	6.200
23	2.902	8.600
24	2.902	10.000
25	3.870	0.000
26	3.870	1.400
27	3.870	3.800
28	3.870	6.200
29	3.870	8.600
30	3.870	10.000
31	4.837	0.000
32	4.837	1.400
33	4.837	3.800
34	4.837	6.200
35	4.837	8.600
36	4.837	10.000
37	5.805	0.000
38	5.805	1.400
39	5.805	3.800
40	5.805	6.200
41	5.805	8.600
42	5.805	10.000
43	6.772	0.000
44	6.772	1.400
45	6.772	3.800
46	6.772	6.200
47	6.772	8.600
48	6.772	10.000
49	7.740	0.000
50	7.740	1.400
51	7.740	3.800
52	7.740	6.200
53	7.740	8.600
54	7.740	10.000
55	8.707	0.000

Ing. Antonio N. Pangrazio
Director de Fiscalización

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

Nudo	X (m)	Y (m)
56	8.707	1.400
57	8.707	3.800
58	8.707	6.200
59	8.707	8.600
60	8.707	10.000
61	9.675	0.000
62	9.675	1.400
63	9.675	3.800
64	9.675	6.200
65	9.675	8.600
66	9.675	10.000
67	10.642	0.000
68	10.642	1.400
69	10.642	3.800
70	10.642	6.200
71	10.642	8.600
72	10.642	10.000
73	11.610	0.000
74	11.610	1.400
75	11.610	3.800
76	11.610	6.200
77	11.610	8.600
78	11.610	10.000
79	12.577	0.000
80	12.577	1.400
81	12.577	3.800
82	12.577	6.200
83	12.577	8.600
84	12.577	10.000
85	13.545	0.000
86	13.545	1.400
87	13.545	3.800
88	13.545	6.200
89	13.545	8.600
90	13.545	10.000
91	14.512	0.000
92	14.512	1.400
93	14.512	3.800
94	14.512	6.200
95	14.512	8.600
96	14.512	10.000
97	15.480	0.000
98	15.480	1.400
99	15.480	3.800
100	15.480	6.200
101	15.480	8.600
102	15.480	10.000
103	16.447	0.000
104	16.447	1.400
105	16.447	3.800
106	16.447	6.200
107	16.447	8.600
108	16.447	10.000
109	17.415	0.000
110	17.415	1.400
111	17.415	3.800
112	17.415	6.200
113	17.415	8.600
114	17.415	10.000

Ing. Antonio N. Pangrazio
Director de Fiscalización

innova Precast, S.L.

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann **S.A.**

Nudo	X (m)	Y (m)
115	18.382	0.000
116	18.382	1.400
117	18.382	3.800
118	18.382	6.200
119	18.382	8.600
120	18.382	10.000
121	19.350	0.000
122	19.350	1.400
123	19.350	3.800
124	19.350	6.200
125	19.350	8.600
126	19.350	10.000

Datos de Apoyos

Nudo	Cte. Elástica (t/m)
2	0.00
3	0.00
4	0.00
5	0.00
122	0.00
123	0.00
124	0.00
125	0.00

Datos de Barras

Barra	Nudo I	Nudo J	Ancho (m)	Inercia (m4)	Inercia a torsion (m4)	Area (m²)
1	1	7	0.700	0.000311	0.000455	0.093333
2	7	13	0.700	0.000311	0.000455	0.093333
3	13	19	0.700	0.000311	0.000455	0.093333
4	19	25	0.700	0.000311	0.000455	0.093333
5	25	31	0.700	0.000311	0.000455	0.093333
6	31	37	0.700	0.000311	0.000455	0.093333
7	37	43	0.700	0.000311	0.000455	0.093333
8	43	49	0.700	0.000311	0.000455	0.093333
9	49	55	0.700	0.000311	0.000455	0.093333
10	55	61	0.700	0.000311	0.000455	0.093333
11	61	67	0.700	0.000311	0.000455	0.093333
12	67	73	0.700	0.000311	0.000455	0.093333
13	73	79	0.700	0.000311	0.000455	0.093333
14	79	85	0.700	0.000311	0.000455	0.093333
15	85	91	0.700	0.000311	0.000455	0.093333
16	91	97	0.700	0.000311	0.000455	0.093333
17	97	103	0.700	0.000311	0.000455	0.093333
18	103	109	0.700	0.000311	0.000455	0.093333
19	109	115	0.700	0.000311	0.000455	0.093333
20	115	121	0.700	0.000311	0.000455	0.093333
21	2	8	1.900	0.147244	0.002628	0.594221
22	8	14	1.900	0.147244	0.002628	0.594221
23	14	20	1.900	0.147244	0.002628	0.594221
24	20	26	1.900	0.147244	0.002628	0.594221
25	26	32	1.900	0.147244	0.002628	0.594221
26	32	38	1.900	0.147244	0.002628	0.594221
27	38	44	1.900	0.147244	0.002628	0.594221
28	44	50	1.900	0.147244	0.002628	0.594221
29	50	56	1.900	0.147244	0.002628	0.594221

innova Precast, S.L.

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

Ing. Antonio M. Pangrazio
Director de Fiscalización

Barra	Nudo I	Nudo J	Ancho (m)	Inercia (m4)	Inercia a torsion (m4)	Area (m²)
30	56	62	1.900	0.147244	0.002628	0.594221
31	62	68	1.900	0.147244	0.002628	0.594221
32	68	74	1.900	0.147244	0.002628	0.594221
33	74	80	1.900	0.147244	0.002628	0.594221
34	80	86	1.900	0.147244	0.002628	0.594221
35	86	92	1.900	0.147244	0.002628	0.594221
36	92	98	1.900	0.147244	0.002628	0.594221
37	98	104	1.900	0.147244	0.002628	0.594221
38	104	110	1.900	0.147244	0.002628	0.594221
39	110	116	1.900	0.147244	0.002628	0.594221
40	116	122	1.900	0.147244	0.002628	0.594221
41	3	9	2.400	0.155643	0.003072	0.660888
42	9	15	2.400	0.155643	0.003072	0.660888
43	15	21	2.400	0.155643	0.003072	0.660888
44	21	27	2.400	0.155643	0.003072	0.660888
45	27	33	2.400	0.155643	0.003072	0.660888
46	33	39	2.400	0.155643	0.003072	0.660888
47	39	45	2.400	0.155643	0.003072	0.660888
48	45	51	2.400	0.155643	0.003072	0.660888
49	51	57	2.400	0.155643	0.003072	0.660888
50	57	63	2.400	0.155643	0.003072	0.660888
51	63	69	2.400	0.155643	0.003072	0.660888
52	69	75	2.400	0.155643	0.003072	0.660888
53	75	81	2.400	0.155643	0.003072	0.660888
54	81	87	2.400	0.155643	0.003072	0.660888
55	87	93	2.400	0.155643	0.003072	0.660888
56	93	99	2.400	0.155643	0.003072	0.660888
57	99	105	2.400	0.155643	0.003072	0.660888
58	105	111	2.400	0.155643	0.003072	0.660888
59	111	117	2.400	0.155643	0.003072	0.660888
60	117	123	2.400	0.155643	0.003072	0.660888
61	4	10	2.400	0.155643	0.003072	0.660888
62	10	16	2.400	0.155643	0.003072	0.660888
63	16	22	2.400	0.155643	0.003072	0.660888
64	22	28	2.400	0.155643	0.003072	0.660888
65	28	34	2.400	0.155643	0.003072	0.660888
66	34	40	2.400	0.155643	0.003072	0.660888
67	40	46	2.400	0.155643	0.003072	0.660888
68	46	52	2.400	0.155643	0.003072	0.660888
69	52	58	2.400	0.155643	0.003072	0.660888
70	58	64	2.400	0.155643	0.003072	0.660888
71	64	70	2.400	0.155643	0.003072	0.660888
72	70	76	2.400	0.155643	0.003072	0.660888
73	76	82	2.400	0.155643	0.003072	0.660888
74	82	88	2.400	0.155643	0.003072	0.660888
75	88	94	2.400	0.155643	0.003072	0.660888
76	94	100	2.400	0.155643	0.003072	0.660888
77	100	106	2.400	0.155643	0.003072	0.660888
78	106	112	2.400	0.155643	0.003072	0.660888
79	112	118	2.400	0.155643	0.003072	0.660888
80	118	124	2.400	0.155643	0.003072	0.660888
81	5	11	1.900	0.147244	0.002628	0.594221
82	11	17	1.900	0.147244	0.002628	0.594221
83	17	23	1.900	0.147244	0.002628	0.594221
84	23	29	1.900	0.147244	0.002628	0.594221
85	29	35	1.900	0.147244	0.002628	0.594221
86	35	41	1.900	0.147244	0.002628	0.594221
87	41	47	1.900	0.147244	0.002628	0.594221
88	47	53	1.900	0.147244	0.002628	0.594221

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

innova Precast, S.L.

Ing. Antonio N. Pangrazio
Director de Fiscalizacion

Barra	Nudo I	Nudo J	Ancho (m)	Inercia (m4)	Inercia a torsion (m4)	Area (m²)
89	53	59	1.900	0.147244	0.002628	0.594221
90	59	65	1.900	0.147244	0.002628	0.594221
91	65	71	1.900	0.147244	0.002628	0.594221
92	71	77	1.900	0.147244	0.002628	0.594221
93	77	83	1.900	0.147244	0.002628	0.594221
94	83	89	1.900	0.147244	0.002628	0.594221
95	89	95	1.900	0.147244	0.002628	0.594221
96	95	101	1.900	0.147244	0.002628	0.594221
97	101	107	1.900	0.147244	0.002628	0.594221
98	107	113	1.900	0.147244	0.002628	0.594221
99	113	119	1.900	0.147244	0.002628	0.594221
100	119	125	1.900	0.147244	0.002628	0.594221
101	6	12	0.700	0.000311	0.000455	0.093333
102	12	18	0.700	0.000311	0.000455	0.093333
103	18	24	0.700	0.000311	0.000455	0.093333
104	24	30	0.700	0.000311	0.000455	0.093333
105	30	36	0.700	0.000311	0.000455	0.093333
106	36	42	0.700	0.000311	0.000455	0.093333
107	42	48	0.700	0.000311	0.000455	0.093333
108	48	54	0.700	0.000311	0.000455	0.093333
109	54	60	0.700	0.000311	0.000455	0.093333
110	60	66	0.700	0.000311	0.000455	0.093333
111	66	72	0.700	0.000311	0.000455	0.093333
112	72	78	0.700	0.000311	0.000455	0.093333
113	78	84	0.700	0.000311	0.000455	0.093333
114	84	90	0.700	0.000311	0.000455	0.093333
115	90	96	0.700	0.000311	0.000455	0.093333
116	96	102	0.700	0.000311	0.000455	0.093333
117	102	108	0.700	0.000311	0.000455	0.093333
118	108	114	0.700	0.000311	0.000455	0.093333
119	114	120	0.700	0.000311	0.000455	0.093333
120	120	126	0.700	0.000311	0.000455	0.093333
121	1	2	0.484	0.000215	0.000430	0.064500
122	2	3	0.484	0.000215	0.000430	0.064500
123	3	4	0.484	0.000215	0.000430	0.064500
124	4	5	0.484	0.000215	0.000430	0.064500
125	5	6	0.484	0.000215	0.000430	0.064500
126	7	8	0.967	0.000430	0.000860	0.129000
127	8	9	0.968	0.000430	0.000860	0.129000
128	9	10	0.968	0.000430	0.000860	0.129000
129	10	11	0.968	0.000430	0.000860	0.129000
130	11	12	0.968	0.000430	0.000860	0.129000
131	13	14	0.967	0.000430	0.000860	0.129000
132	14	15	0.967	0.000430	0.000860	0.129000
133	15	16	0.967	0.000430	0.000860	0.129000
134	16	17	0.967	0.000430	0.000860	0.129000
135	17	18	0.967	0.000430	0.000860	0.129000
136	19	20	0.967	0.000430	0.000860	0.129000
137	20	21	0.967	0.000430	0.000860	0.129000
138	21	22	0.967	0.000430	0.000860	0.129000
139	22	23	0.967	0.000430	0.000860	0.129000
140	23	24	0.967	0.000430	0.000860	0.129000
141	25	26	0.967	0.000430	0.000860	0.129000
142	26	27	0.967	0.000430	0.000860	0.129000
143	27	28	0.967	0.000430	0.000860	0.129000
144	28	29	0.967	0.000430	0.000860	0.129000
145	29	30	0.967	0.000430	0.000860	0.129000
146	31	32	0.967	0.000430	0.000860	0.129000
147	32	33	0.967	0.000430	0.000860	0.129000

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

innova Precast, S.L.
Ing. Antonio M. Pangrazio
Director de Fiscalización

Barra	Nudo I	Nudo J	Ancho (m)	Inercia (m4)	Inercia a torsion (m4)	Area (m²)
148	33	34	0.967	0.000430	0.000860	0.129000
149	34	35	0.967	0.000430	0.000860	0.129000
150	35	36	0.967	0.000430	0.000860	0.129000
151	37	38	0.967	0.000430	0.000860	0.129000
152	38	39	0.967	0.000430	0.000860	0.129000
153	39	40	0.967	0.000430	0.000860	0.129000
154	40	41	0.967	0.000430	0.000860	0.129000
155	41	42	0.967	0.000430	0.000860	0.129000
156	43	44	0.967	0.000430	0.000860	0.129000
157	44	45	0.967	0.000430	0.000860	0.129000
158	45	46	0.967	0.000430	0.000860	0.129000
159	46	47	0.967	0.000430	0.000860	0.129000
160	47	48	0.967	0.000430	0.000860	0.129000
161	49	50	0.967	0.000430	0.000860	0.129000
162	50	51	0.967	0.000430	0.000860	0.129000
163	51	52	0.967	0.000430	0.000860	0.129000
164	52	53	0.967	0.000430	0.000860	0.129000
165	53	54	0.967	0.000430	0.000860	0.129000
166	55	56	0.967	0.000430	0.000860	0.129000
167	56	57	0.967	0.000430	0.000860	0.129000
168	57	58	0.967	0.000430	0.000860	0.129000
169	58	59	0.967	0.000430	0.000860	0.129000
170	59	60	0.967	0.000430	0.000860	0.129000
171	61	62	0.967	0.000430	0.000860	0.129000
172	62	63	0.967	0.000430	0.000860	0.129000
173	63	64	0.967	0.000430	0.000860	0.129000
174	64	65	0.967	0.000430	0.000860	0.129000
175	65	66	0.967	0.000430	0.000860	0.129000
176	67	68	0.967	0.000430	0.000860	0.129000
177	68	69	0.967	0.000430	0.000860	0.129000
178	69	70	0.967	0.000430	0.000860	0.129000
179	70	71	0.967	0.000430	0.000860	0.129000
180	71	72	0.967	0.000430	0.000860	0.129000
181	73	74	0.967	0.000430	0.000860	0.129000
182	74	75	0.967	0.000430	0.000860	0.129000
183	75	76	0.967	0.000430	0.000860	0.129000
184	76	77	0.967	0.000430	0.000860	0.129000
185	77	78	0.967	0.000430	0.000860	0.129000
186	79	80	0.967	0.000430	0.000860	0.129000
187	80	81	0.967	0.000430	0.000860	0.129000
188	81	82	0.967	0.000430	0.000860	0.129000
189	82	83	0.967	0.000430	0.000860	0.129000
190	83	84	0.967	0.000430	0.000860	0.129000
191	85	86	0.967	0.000430	0.000860	0.129000
192	86	87	0.967	0.000430	0.000860	0.129000
193	87	88	0.967	0.000430	0.000860	0.129000
194	88	89	0.967	0.000430	0.000860	0.129000
195	89	90	0.967	0.000430	0.000860	0.129000
196	91	92	0.967	0.000430	0.000860	0.129000
197	92	93	0.967	0.000430	0.000860	0.129000
198	93	94	0.967	0.000430	0.000860	0.129000
199	94	95	0.967	0.000430	0.000860	0.129000
200	95	96	0.967	0.000430	0.000860	0.129000
201	97	98	0.967	0.000430	0.000860	0.129000
202	98	99	0.967	0.000430	0.000860	0.129000
203	99	100	0.967	0.000430	0.000860	0.129000
204	100	101	0.967	0.000430	0.000860	0.129000
205	101	102	0.967	0.000430	0.000860	0.129000
206	103	104	0.967	0.000430	0.000860	0.129000

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

innova Precast S.L.

Ing. Antonio N. Mangrazio
Director de Fiscalización

Barra	Nudo I	Nudo J	Ancho (m)	Inercia (m4)	Inercia a torsion (m4)	Area (m²)
207	104	105	0.967	0.000430	0.000860	0.129000
208	105	106	0.967	0.000430	0.000860	0.129000
209	106	107	0.967	0.000430	0.000860	0.129000
210	107	108	0.967	0.000430	0.000860	0.129000
211	109	110	0.967	0.000430	0.000860	0.129000
212	110	111	0.967	0.000430	0.000860	0.129000
213	111	112	0.967	0.000430	0.000860	0.129000
214	112	113	0.967	0.000430	0.000860	0.129000
215	113	114	0.967	0.000430	0.000860	0.129000
216	115	116	0.968	0.000430	0.000860	0.129000
217	116	117	0.968	0.000430	0.000860	0.129000
218	117	118	0.968	0.000430	0.000860	0.129000
219	118	119	0.968	0.000430	0.000860	0.129000
220	119	120	0.967	0.000430	0.000860	0.129000
221	121	122	0.484	0.000215	0.000430	0.064500
222	122	123	0.484	0.000215	0.000430	0.064500
223	123	124	0.484	0.000215	0.000430	0.064500
224	124	125	0.484	0.000215	0.000430	0.064500
225	125	126	0.484	0.000215	0.000430	0.064500

Datos de Tramos de Vigas

Tramo	Viga	Ancho (m)	Canto (m)	Area (m²)	Va (m)	Vb (m)	Inercia (m4)	Inercia a torsion (m4)
1	1	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
2	1	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
3	1	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
4	1	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
5	1	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
6	1	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
7	1	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
8	1	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
9	1	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
10	1	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
11	1	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
12	1	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
13	1	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
14	1	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
15	1	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
16	1	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
17	1	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
18	1	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
19	1	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
20	1	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
21	2	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
22	2	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
23	2	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
24	2	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
25	2	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
26	2	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
27	2	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
28	2	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
29	2	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
30	2	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
31	2	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
32	2	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
33	2	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
34	2	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

innova Precast, S.L.

Ing. Antonio N. Pangrazio
Director de Fiscalización

Tramo	Viga	Ancho (m)	Canto (m)	Area (m²)	Va (m)	Vb (m)	Inercia (m4)	Inercia a torsion (m4)
35	2	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
36	2	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
37	2	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
38	2	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
39	2	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
40	2	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
41	3	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
42	3	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
43	3	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
44	3	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
45	3	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
46	3	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
47	3	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
48	3	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
49	3	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
50	3	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
51	3	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
52	3	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
53	3	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
54	3	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
55	3	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
56	3	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
57	3	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
58	3	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
59	3	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
60	3	2.400	1.400	0.6609	0.2673	0.9327	0.155643	0.003072
61	4	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
62	4	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
63	4	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
64	4	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
65	4	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
66	4	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
67	4	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
68	4	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
69	4	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
70	4	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
71	4	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
72	4	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
73	4	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
74	4	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
75	4	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
76	4	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
77	4	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
78	4	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
79	4	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250
80	4	2.600	1.400	0.6876	0.2531	0.9469	0.159191	0.003250

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

Ing. Antonio N. Pangrazio
Dirección de Fiscalización

Envolvente de esfuerzos (Estados límites de servicio)

Cortantes

Viga	Tramo	Peso Propio	Peso Propio	C.P.	C.P.	S.C.	S.C.	Camión AASHTO	Camión AASHTO	Carril	Carril	TOTAL	TOTAL
		Viga	Losa	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.
1	1	-8.26	-12.58	-14.92	-16.97	0.17	-3.85	1.18	-16.60	0.34	-6.10	-34.07	-64.36
-	-	-7.44	-11.32	-14.92	-16.97	0.17	-3.85	1.18	-16.60	0.34	-6.10	-31.99	-62.28
1	2	-7.44	-11.32	-12.84	-14.71	0.17	-3.27	1.00	-15.99	0.28	-5.40	-30.14	-58.12
-	-	-6.61	-10.06	-12.84	-14.71	0.17	-3.27	1.00	-15.99	0.28	-5.40	-28.06	-56.04
1	3	-6.61	-10.06	-10.99	-12.67	0.16	-2.76	0.89	-15.88	0.25	-5.78	-26.37	-53.77
-	-	-5.78	-8.80	-10.99	-12.67	0.16	-2.76	0.89	-15.88	0.25	-5.78	-24.29	-51.68
1	4	-5.78	-8.80	-9.30	-10.78	0.14	-2.32	0.79	-15.78	0.22	-5.08	-22.74	-48.55
-	-	-4.96	-7.55	-9.30	-10.78	0.14	-2.32	0.79	-15.78	0.22	-5.08	-20.65	-46.46
1	5	-4.96	-7.55	-7.72	-8.98	0.12	-1.91	0.69	-12.40	0.20	-4.35	-19.22	-40.15
-	-	-4.13	-6.29	-7.72	-8.98	0.12	-1.91	0.69	-12.40	0.20	-4.35	-17.13	-38.07
1	6	-4.13	-6.29	-6.22	-7.26	0.11	-1.53	2.08	-12.17	0.17	-3.60	-14.29	-34.97
-	-	-3.31	-5.03	-6.22	-7.26	0.11	-1.53	2.08	-12.17	0.17	-3.60	-12.20	-32.89
1	7	-3.31	-5.03	-4.78	-5.59	0.09	-1.17	3.93	-12.07	0.13	-2.82	-8.97	-29.99
-	-	-2.48	-3.77	-4.78	-5.59	0.09	-1.17	3.93	-12.07	0.13	-2.82	-6.88	-27.90
1	8	-2.48	-3.77	-3.38	-3.97	0.06	-0.82	4.01	-8.99	0.10	-2.03	-5.47	-22.06
-	-	-1.65	-2.52	-3.38	-3.97	0.06	-0.82	4.01	-8.99	0.10	-2.03	-3.38	-19.98
1	9	-1.65	-2.52	-2.02	-2.37	0.04	-0.49	6.38	-8.91	0.06	-1.22	0.29	-17.16
-	-	-0.83	-1.26	-2.02	-2.37	0.04	-0.49	6.38	-8.91	0.06	-1.22	2.37	-15.07
1	10	-0.83	-1.26	-0.67	-0.79	0.01	-0.16	7.47	-8.34	0.02	-0.41	4.74	-11.78
-	-	-0.00	-0.00	-0.67	-0.79	0.01	-0.16	7.47	-8.34	0.02	-0.41	6.83	-9.69
1	11	-0.00	-0.00	0.79	0.67	0.16	-0.01	8.06	-6.46	0.41	-0.02	9.42	-5.82
-	-	0.83	1.26	0.79	0.67	0.16	-0.01	8.06	-6.46	0.41	-0.02	11.50	-3.74
1	12	0.83	1.26	2.37	2.02	0.49	-0.04	8.91	-6.38	1.22	-0.06	15.07	-2.37
-	-	1.65	2.52	2.37	2.02	0.49	-0.04	8.91	-6.38	1.22	-0.06	17.16	-0.29
1	13	1.65	2.52	3.97	3.38	0.82	-0.06	11.71	-4.01	2.03	-0.10	22.69	3.38
-	-	2.48	3.77	3.97	3.38	0.82	-0.06	11.71	-4.01	2.03	-0.10	24.77	5.47
1	14	2.48	3.77	5.59	4.78	1.17	-0.09	11.79	-3.93	2.82	-0.13	27.63	6.88
-	-	3.31	5.03	5.59	4.78	1.17	-0.09	11.79	-3.93	2.82	-0.13	29.71	8.97
1	15	3.31	5.03	7.26	6.22	1.53	-0.11	11.87	-2.09	3.60	-0.17	32.59	12.19
-	-	4.13	6.29	7.26	6.22	1.53	-0.11	11.87	-2.09	3.60	-0.17	34.68	14.28
1	16	4.13	6.29	8.98	7.72	1.91	-0.12	15.45	-0.68	4.35	-0.20	41.11	17.14
-	-	4.96	7.55	8.98	7.72	1.91	-0.12	15.45	-0.68	4.35	-0.20	43.20	19.22
1	17	4.96	7.55	10.78	9.30	2.32	-0.14	15.54	-0.79	5.08	-0.22	46.22	20.65
-	-	5.78	8.80	10.78	9.30	2.32	-0.14	15.54	-0.79	5.08	-0.22	48.31	22.73
1	18	5.78	8.80	12.67	10.99	2.76	-0.16	17.38	-0.90	5.78	-0.25	53.18	24.28
-	-	6.61	10.06	12.67	10.99	2.76	-0.16	17.38	-0.90	5.78	-0.25	55.27	26.36
1	19	6.61	10.06	14.71	12.84	3.27	-0.17	19.17	-1.02	5.40	-0.28	59.21	28.04
-	-	7.44	11.32	14.71	12.84	3.27	-0.17	19.17	-1.02	5.40	-0.28	61.30	30.13
1	20	7.44	11.32	16.97	14.92	3.85	-0.17	19.34	-1.20	6.10	-0.34	65.01	31.97
-	-	8.26	12.58	16.97	14.92	3.85	-0.17	19.34	-1.20	6.10	-0.34	67.10	34.05
2	21	-8.26	-11.61	-4.57	-7.66	0.37	0.00	0.00	-21.07	0.00	-8.73	-24.07	-57.33
-	-	-7.44	-10.45	-4.57	-7.66	0.37	0.00	0.00	-21.07	0.00	-8.73	-22.08	-55.35
2	22	-7.44	-10.45	-4.60	-7.33	0.26	-0.12	0.00	-20.34	0.00	-6.30	-22.22	-51.97
-	-	-6.61	-9.29	-4.60	-7.33	0.26	-0.12	0.00	-20.34	0.00	-6.30	-20.24	-49.98
2	23	-6.61	-9.29	-4.39	-6.77	0.27	-0.28	0.00	-20.59	0.00	-5.50	-20.01	-49.03
-	-	-5.78	-8.13	-4.39	-6.77	0.27	-0.28	0.00	-20.59	0.00	-5.50	-18.03	-47.05
2	24	-5.78	-8.13	-4.03	-6.08	0.27	-0.36	0.00	-21.03	0.00	-4.72	-17.67	-46.10
-	-	-4.96	-6.97	-4.03	-6.08	0.27	-0.36	0.00	-21.03	0.00	-4.72	-15.68	-44.11
2	25	-4.96	-6.97	-3.56	-5.28	0.26	-0.39	0.00	-15.40	0.00	-3.97	-15.23	-36.96
-	-	-4.13	-5.80	-3.56	-5.28	0.26	-0.39	0.00	-15.40	0.00	-3.97	-13.24	-34.97
2	26	-4.13	-5.80	-3.01	-4.41	0.22	-0.37	5.25	-15.97	0.00	-3.23	-7.47	-33.91

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

innova Precast, S.L.
Ing. Antonio M. Pangrazio
Director de Fabricación

Viga	Tramo	Peso Propio	Peso Propio	C.P.	C.P.	S.C.	S.C.	Camión AASHTO	Camión AASHTO	Carril	Carril	TOTAL	TOTAL
		Viga	Losa	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.
-	-	-3.31	-4.64	-3.01	-4.41	0.22	-0.37	5.25	-15.97	0.00	-3.23	-5.48	-31.92
2	27	-3.31	-4.64	-2.40	-3.48	0.18	-0.32	7.91	-16.54	0.00	-2.50	-2.25	-30.79
-	-	-2.48	-3.48	-2.40	-3.48	0.18	-0.32	7.91	-16.54	0.00	-2.50	-0.27	-28.80
2	28	-2.48	-3.48	-1.75	-2.52	0.14	-0.24	7.37	-12.83	0.00	-1.78	-0.20	-23.34
-	-	-1.65	-2.32	-1.75	-2.52	0.14	-0.24	7.37	-12.83	0.00	-1.78	1.79	-21.35
2	29	-1.65	-2.32	-1.06	-1.52	0.08	-0.15	11.24	-13.52	0.00	-1.06	6.29	-20.23
-	-	-0.83	-1.16	-1.06	-1.52	0.08	-0.15	11.24	-13.52	0.00	-1.06	8.28	-18.25
2	30	-0.83	-1.16	-0.36	-0.51	0.03	-0.05	12.24	-12.97	0.00	-0.35	9.93	-15.87
-	-	-0.00	-0.00	-0.36	-0.51	0.03	-0.05	12.24	-12.97	0.00	-0.35	11.91	-13.89
2	31	-0.00	-0.00	0.51	0.36	0.05	-0.03	12.32	-10.56	0.35	0.00	13.24	-10.23
-	-	0.83	1.16	0.51	0.36	0.05	-0.03	12.32	-10.56	0.35	0.00	15.22	-8.24
2	32	0.83	1.16	1.52	1.06	0.15	-0.08	13.52	-11.24	1.06	0.00	18.25	-8.28
-	-	1.65	2.32	1.52	1.06	0.15	-0.08	13.52	-11.24	1.06	0.00	20.23	-6.29
2	33	1.65	2.32	2.52	1.75	0.24	-0.14	16.65	-7.37	1.78	0.00	25.17	-1.79
-	-	2.48	3.48	2.52	1.75	0.24	-0.14	16.65	-7.37	1.78	0.00	27.16	0.20
2	34	2.48	3.48	3.48	2.40	0.32	-0.18	15.88	-7.91	2.50	0.00	28.14	0.27
-	-	3.31	4.64	3.48	2.40	0.32	-0.18	15.88	-7.91	2.50	0.00	30.13	2.25
2	35	3.31	4.64	4.41	3.01	0.37	-0.22	15.97	-5.25	3.23	0.00	31.92	5.48
-	-	4.13	5.80	4.41	3.01	0.37	-0.22	15.97	-5.25	3.23	0.00	33.91	7.47
2	36	4.13	5.80	5.28	3.56	0.39	-0.26	20.46	0.00	3.97	0.00	40.03	13.24
-	-	4.96	6.97	5.28	3.56	0.39	-0.26	20.46	0.00	3.97	0.00	42.01	15.23
2	37	4.96	6.97	6.08	4.03	0.36	-0.27	19.87	0.00	4.72	0.00	42.95	15.68
-	-	5.78	8.13	6.08	4.03	0.36	-0.27	19.87	0.00	4.72	0.00	44.94	17.67
2	38	5.78	8.13	6.77	4.39	0.28	-0.27	23.29	0.00	5.50	0.00	49.75	18.03
-	-	6.61	9.29	6.77	4.39	0.28	-0.27	23.29	0.00	5.50	0.00	51.74	20.01
2	39	6.61	9.29	7.33	4.60	0.12	-0.26	25.81	0.00	6.30	0.00	55.45	20.24
-	-	7.44	10.45	7.33	4.60	0.12	-0.26	25.81	0.00	6.30	0.00	57.44	22.22
2	40	7.44	10.45	7.66	4.57	0.00	-0.37	25.80	0.00	8.73	0.00	60.08	22.08
-	-	8.26	11.61	7.66	4.57	0.00	-0.37	25.80	0.00	8.73	0.00	62.07	24.07
3	41	-8.26	-11.61	-4.57	-7.66	0.37	0.00	0.00	-21.07	0.00	-8.89	-24.07	-57.49
-	-	-7.44	-10.45	-4.57	-7.66	0.37	0.00	0.00	-21.07	0.00	-8.89	-22.08	-55.50
3	42	-7.44	-10.45	-4.60	-7.33	0.26	-0.12	0.00	-20.34	0.00	-7.62	-22.22	-53.29
-	-	-6.61	-9.29	-4.60	-7.33	0.26	-0.12	0.00	-20.34	0.00	-7.62	-20.24	-51.30
3	43	-6.61	-9.29	-4.39	-6.77	0.27	-0.28	0.00	-20.59	0.00	-6.50	-20.01	-50.04
-	-	-5.78	-8.13	-4.39	-6.77	0.27	-0.28	0.00	-20.59	0.00	-6.50	-18.03	-48.05
3	44	-5.78	-8.13	-4.03	-6.08	0.27	-0.36	0.00	-21.03	0.00	-5.47	-17.67	-46.85
-	-	-4.96	-6.97	-4.03	-6.08	0.27	-0.36	0.00	-21.03	0.00	-5.47	-15.68	-44.86
3	45	-4.96	-6.97	-3.56	-5.28	0.26	-0.39	0.00	-15.40	0.00	-4.52	-15.23	-37.51
-	-	-4.13	-5.80	-3.56	-5.28	0.26	-0.39	0.00	-15.40	0.00	-4.52	-13.24	-35.53
3	46	-4.13	-5.80	-3.01	-4.41	0.22	-0.37	5.25	-15.97	0.00	-3.62	-7.47	-34.31
-	-	-3.31	-4.64	-3.01	-4.41	0.22	-0.37	5.25	-15.97	0.00	-3.62	-5.48	-32.32
3	47	-3.31	-4.64	-2.40	-3.48	0.18	-0.32	7.91	-16.54	0.00	-2.77	-2.25	-31.06
-	-	-2.48	-3.48	-2.40	-3.48	0.18	-0.32	7.91	-16.54	0.00	-2.77	-0.27	-29.08
3	48	-2.48	-3.48	-1.75	-2.52	0.14	-0.24	7.37	-12.83	0.00	-1.96	-0.20	-23.51
-	-	-1.65	-2.32	-1.75	-2.52	0.14	-0.24	7.37	-12.83	0.00	-1.96	1.79	-21.53
3	49	-1.65	-2.32	-1.06	-1.52	0.08	-0.15	11.24	-13.52	0.00	-1.16	6.29	-20.33
-	-	-0.83	-1.16	-1.06	-1.52	0.08	-0.15	11.24	-13.52	0.00	-1.16	8.28	-18.35
3	50	-0.83	-1.16	-0.36	-0.51	0.03	-0.05	12.24	-12.97	0.00	-0.39	9.93	-15.91
-	-	0.00	0.00	-0.36	-0.51	0.03	-0.05	12.24	-12.97	0.00	-0.39	11.91	-13.92
3	51	0.00	0.00	0.51	0.36	0.05	-0.03	12.32	-10.56	0.39	0.00	13.27	-10.23
-	-	0.83	1.16	0.51	0.36	0.05	-0.03	12.32	-10.56	0.39	0.00	15.26	-8.24
3	52	0.83	1.16	1.52	1.06	0.15	-0.08	13.52	-11.24	1.16	0.00	18.35	-8.28
-	-	1.65	2.32	1.52	1.06	0.15	-0.08	13.52	-11.24	1.16	0.00	20.33	-6.29
3	53	1.65	2.32	2.52	1.75	0.24	-0.14	16.65	-7.37	1.96	0.00	25.35	-1.79
-	-	2.48	3.48	2.52	1.75	0.24	-0.14	16.65	-7.37	1.96	0.00	27.33	0.20
3	54	2.48	3.48	3.48	2.40	0.32	-0.18	15.88	-7.91	2.77	0.00	28.42	0.27
-	-	3.31	4.64	3.48	2.40	0.32	-0.18	15.88	-7.91	2.77	0.00	30.41	2.25
3	55	3.31	4.64	4.41	3.01	0.37	-0.22	15.97	-5.25	3.62	0.00	32.32	5.48

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

Ing. Antonio [illegible] Pangrazio
Director de Fiscalizacion

Viga	Tramo	Peso Propio	Peso Propio	C.P.	C.P.	S.C.	S.C.	Camión AASHTO	Camión AASHTO	Carril	Carril	TOTAL	TOTAL
		Viga	Losa	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.
-	-	4.13	5.80	4.41	3.01	0.37	-0.22	15.97	-5.25	3.62	0.00	34.31	7.47
3	56	4.13	5.80	5.28	3.56	0.39	-0.26	20.46	0.00	4.52	0.00	40.58	13.24
-	-	4.96	6.97	5.28	3.56	0.39	-0.26	20.46	0.00	4.52	0.00	42.57	15.23
3	57	4.96	6.97	6.08	4.03	0.36	-0.27	19.87	0.00	5.47	0.00	43.71	15.68
-	-	5.78	8.13	6.08	4.03	0.36	-0.27	19.87	0.00	5.47	0.00	45.69	17.67
3	58	5.78	8.13	6.77	4.39	0.28	-0.27	23.29	0.00	6.50	0.00	50.75	18.03
-	-	6.61	9.29	6.77	4.39	0.28	-0.27	23.29	0.00	6.50	0.00	52.74	20.01
3	59	6.61	9.29	7.33	4.60	0.12	-0.26	25.81	0.00	7.62	0.00	56.77	20.24
-	-	7.44	10.45	7.33	4.60	0.12	-0.26	25.81	0.00	7.62	0.00	58.76	22.22
3	60	7.44	10.45	7.66	4.57	0.00	-0.37	25.80	0.00	8.89	0.00	60.24	22.08
-	-	8.26	11.61	7.66	4.57	0.00	-0.37	25.80	0.00	8.89	0.00	62.23	24.07
4	61	-8.26	-12.58	-14.92	-16.97	0.17	-3.85	1.18	-16.60	0.42	-4.40	-33.99	-62.66
-	-	-7.44	-11.32	-14.92	-16.97	0.17	-3.85	1.18	-16.60	0.42	-4.40	-31.91	-60.58
4	62	-7.44	-11.32	-12.84	-14.71	0.17	-3.27	1.00	-15.99	0.38	-4.01	-30.05	-56.73
-	-	-6.61	-10.06	-12.84	-14.71	0.17	-3.27	1.00	-15.99	0.38	-4.01	-27.96	-54.65
4	63	-6.61	-10.06	-10.99	-12.67	0.16	-2.76	0.89	-15.88	0.35	-3.59	-26.27	-51.58
-	-	-5.78	-8.80	-10.99	-12.67	0.16	-2.76	0.89	-15.88	0.35	-3.59	-24.19	-49.49
4	64	-5.78	-8.80	-9.30	-10.78	0.14	-2.32	0.79	-15.78	0.32	-3.16	-22.64	-46.62
-	-	-4.96	-7.55	-9.30	-10.78	0.14	-2.32	0.79	-15.78	0.32	-3.16	-20.56	-44.54
4	65	-4.96	-7.55	-7.72	-8.98	0.12	-1.91	0.69	-12.40	0.29	-2.70	-19.13	-38.50
-	-	-4.13	-6.29	-7.72	-8.98	0.12	-1.91	0.69	-12.40	0.29	-2.70	-17.04	-36.42
4	66	-4.13	-6.29	-6.22	-7.26	0.11	-1.53	2.08	-12.17	0.24	-2.23	-14.21	-33.61
-	-	-3.31	-5.03	-6.22	-7.26	0.11	-1.53	2.08	-12.17	0.24	-2.23	-12.12	-31.53
4	67	-3.31	-5.03	-4.78	-5.59	0.09	-1.17	3.93	-12.07	0.20	-1.75	-8.90	-28.92
-	-	-2.48	-3.77	-4.78	-5.59	0.09	-1.17	3.93	-12.07	0.20	-1.75	-6.82	-26.83
4	68	-2.48	-3.77	-3.38	-3.97	0.06	-0.82	4.01	-8.99	0.14	-1.51	-5.42	-21.55
-	-	-1.65	-2.52	-3.38	-3.97	0.06	-0.82	4.01	-8.99	0.14	-1.51	-3.34	-19.47
4	69	-1.65	-2.52	-2.02	-2.37	0.04	-0.49	6.38	-8.91	0.09	-0.91	0.32	-16.85
-	-	-0.83	-1.26	-2.02	-2.37	0.04	-0.49	6.38	-8.91	0.09	-0.91	2.40	-14.77
4	70	-0.83	-1.26	-0.67	-0.79	0.01	-0.16	7.47	-8.34	0.03	-0.31	4.75	-11.68
-	-	0.00	0.00	-0.67	-0.79	0.01	-0.16	7.47	-8.34	0.03	-0.31	6.84	-9.59
4	71	0.00	0.00	0.79	0.67	0.16	-0.01	8.06	-6.46	0.31	-0.03	9.32	-5.83
-	-	0.83	1.26	0.79	0.67	0.16	-0.01	8.06	-6.46	0.31	-0.03	11.40	-3.75
4	72	0.83	1.26	2.37	2.02	0.49	-0.04	8.91	-6.38	0.91	-0.09	14.77	-2.40
-	-	1.65	2.52	2.37	2.02	0.49	-0.04	8.91	-6.38	0.91	-0.09	16.85	-0.32
4	73	1.65	2.52	3.97	3.38	0.82	-0.06	11.71	-4.01	1.51	-0.14	22.18	3.34
-	-	2.48	3.77	3.97	3.38	0.82	-0.06	11.71	-4.01	1.51	-0.14	24.26	5.42
4	74	2.48	3.77	5.59	4.78	1.17	-0.09	11.79	-3.93	1.75	-0.20	26.56	6.82
-	-	3.31	5.03	5.59	4.78	1.17	-0.09	11.79	-3.93	1.75	-0.20	28.64	8.90
4	75	3.31	5.03	7.26	6.22	1.53	-0.11	11.87	-2.09	2.23	-0.24	31.23	12.11
-	-	4.13	6.29	7.26	6.22	1.53	-0.11	11.87	-2.09	2.23	-0.24	33.31	14.20
4	76	4.13	6.29	8.98	7.72	1.91	-0.12	15.45	-0.68	2.70	-0.29	39.46	17.05
-	-	4.96	7.55	8.98	7.72	1.91	-0.12	15.45	-0.68	2.70	-0.29	41.55	19.13
4	77	4.96	7.55	10.78	9.30	2.32	-0.14	15.54	-0.79	3.16	-0.32	44.30	20.55
-	-	5.78	8.80	10.78	9.30	2.32	-0.14	15.54	-0.79	3.16	-0.32	46.38	22.63
4	78	5.78	8.80	12.67	10.99	2.76	-0.16	17.38	-0.90	3.59	-0.35	50.99	24.18
-	-	6.61	10.06	12.67	10.99	2.76	-0.16	17.38	-0.90	3.59	-0.35	53.08	26.26
4	79	6.61	10.06	14.71	12.84	3.27	-0.17	19.17	-1.02	4.01	-0.38	57.82	27.95
-	-	7.44	11.32	14.71	12.84	3.27	-0.17	19.17	-1.02	4.01	-0.38	59.91	30.03
4	80	7.44	11.32	16.97	14.92	3.85	-0.17	19.34	-1.20	4.40	-0.42	63.32	31.89
-	-	8.26	12.58	16.97	14.92	3.85	-0.17	19.34	-1.20	4.40	-0.42	65.40	33.97

Momentos

Viga	Tramo	Peso Propio	Peso Propio	C.P.	C.P.	S.C.	S.C.	Camión AASHTO	Camión AASHTO	Carril	Carril	TOTAL	TOTAL
		Viga	Losa	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.
1	1	0.00	-0.00	-0.13	-0.14	0.00	-0.05	0.19	-0.09	0.08	-0.04	0.14	-0.32

innova Precast, S.A.

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

Ing. Antonio N. Pangrazio
Director de Fiscalizacion

Viga	Tramo	Peso Propio Viga	Peso Propio Losa	C.P. MAX.	C.P. MIN.	S.C. MAX.	S.C. MIN.	Camión AASHTO MAX.	Camión AASHTO MIN.	Carril MAX.	Carril MIN.	TOTAL MAX.	TOTAL MIN.
-	-	7.60	11.56	16.29	14.30	3.68	-0.17	15.98	-1.05	5.86	-0.30	60.96	31.93
1	2	7.60	11.56	16.04	14.03	3.58	-0.17	15.88	-0.88	5.78	-0.24	60.44	31.89
-	-	14.39	21.90	30.28	26.45	6.74	-0.33	31.30	-1.85	11.00	-0.51	115.61	60.05
1	3	14.39	21.90	30.04	26.19	6.64	-0.33	31.39	-1.69	10.93	-0.45	115.29	60.01
-	-	20.39	31.03	42.30	36.83	9.32	-0.48	46.69	-2.55	18.67	-0.70	168.39	84.51
1	4	20.39	31.03	42.08	36.59	9.23	-0.49	46.77	-2.40	18.68	-0.64	168.18	84.48
-	-	25.58	38.94	52.51	45.59	11.47	-0.62	61.84	-3.16	23.60	-0.86	213.95	105.47
1	5	25.58	38.94	52.32	45.38	11.39	-0.63	61.92	-3.02	23.60	-0.81	213.76	105.44
-	-	29.98	45.63	61.01	52.85	13.24	-0.75	72.94	-3.69	27.82	-1.00	250.62	123.03
1	6	29.98	45.63	60.84	52.66	13.17	-0.75	73.01	-3.57	27.82	-0.96	250.46	123.00
-	-	33.58	51.11	67.86	58.68	14.65	-0.85	80.51	-4.12	31.30	-1.12	279.01	137.27
1	7	33.58	51.11	67.73	58.53	14.59	-0.86	80.55	-4.02	31.31	-1.08	278.86	137.26
-	-	36.38	55.37	73.14	63.15	15.72	-0.94	91.73	-4.46	34.03	-1.21	306.37	148.29
1	8	36.38	55.37	73.03	63.04	15.68	-0.94	91.76	-4.39	34.04	-1.18	306.26	148.28
-	-	38.38	58.41	76.87	66.31	16.48	-1.00	95.93	-4.69	36.00	-1.27	322.05	156.13
1	9	38.38	58.41	76.80	66.23	16.45	-1.00	95.94	-4.64	36.00	-1.26	321.97	156.12
-	-	39.57	60.24	79.09	68.18	16.92	-1.04	96.79	-4.81	37.18	-1.31	329.79	160.83
1	10	39.57	60.24	79.05	68.14	16.91	-1.04	96.80	-4.79	37.18	-1.30	329.75	160.82
-	-	39.97	60.84	79.82	68.79	17.07	-1.05	100.11	-4.82	37.57	-1.32	335.38	162.42
1	11	39.97	60.84	79.82	68.79	17.07	-1.05	100.10	-4.82	37.57	-1.32	335.37	162.41
-	-	39.57	60.24	79.05	68.14	16.91	-1.04	97.13	-4.75	37.18	-1.30	330.09	160.87
1	12	39.57	60.24	79.09	68.18	16.92	-1.04	97.11	-4.77	37.18	-1.31	330.11	160.87
-	-	38.38	58.41	76.80	66.23	16.45	-1.00	93.80	-4.63	36.00	-1.26	319.83	156.13
1	13	38.38	58.41	76.87	66.31	16.48	-1.00	93.80	-4.68	36.00	-1.27	319.93	156.14
-	-	36.38	55.37	73.03	63.04	15.68	-0.94	89.79	-4.40	34.04	-1.18	304.29	148.26
1	14	36.38	55.37	73.14	63.15	15.72	-0.94	89.77	-4.48	34.03	-1.21	304.41	148.27
-	-	33.58	51.11	67.73	58.53	14.59	-0.86	85.41	-4.06	31.31	-1.08	283.72	137.22
1	15	33.58	51.11	67.86	58.68	14.65	-0.85	85.37	-4.16	31.30	-1.12	283.87	137.24
-	-	29.98	45.63	60.84	52.66	13.17	-0.75	75.36	-3.62	27.82	-0.96	252.81	122.95
1	16	29.98	45.63	61.01	52.85	13.24	-0.75	75.31	-3.74	27.82	-1.00	252.99	122.98
-	-	25.58	38.94	52.32	45.38	11.39	-0.63	61.17	-3.07	23.60	-0.81	213.01	105.39
1	17	25.58	38.94	52.51	45.59	11.47	-0.62	61.09	-3.21	23.60	-0.86	213.19	105.42
-	-	20.39	31.03	42.08	36.59	9.23	-0.49	53.55	-2.44	18.68	-0.64	174.96	84.43
1	18	20.39	31.03	42.30	36.83	9.32	-0.48	53.69	-2.60	18.67	-0.70	175.39	84.47
-	-	14.39	21.90	30.04	26.19	6.64	-0.33	36.87	-1.73	10.93	-0.45	120.78	59.97
1	19	14.39	21.90	30.28	26.45	6.74	-0.33	37.02	-1.89	11.00	-0.51	121.33	60.01
-	-	7.60	11.56	16.04	14.03	3.58	-0.17	18.48	-0.90	5.78	-0.24	63.03	31.87
1	20	7.60	11.56	16.29	14.30	3.68	-0.17	18.63	-1.07	5.86	-0.30	63.61	31.92
-	-	0.00	-0.00	-0.13	-0.14	0.00	-0.05	0.19	-0.09	0.08	-0.04	0.14	-0.32
2	21	0.00	-0.00	0.14	0.13	0.05	0.00	0.05	-0.15	0.01	-0.05	0.25	-0.08
-	-	7.60	10.67	7.54	4.56	0.00	-0.31	20.24	0.00	8.39	0.00	54.43	22.51
2	22	7.60	10.67	7.79	4.83	0.00	-0.20	19.96	0.00	8.27	0.00	54.28	22.89
-	-	14.39	20.22	14.88	9.27	0.09	-0.43	39.63	0.00	15.56	0.00	104.78	43.45
2	23	14.39	20.22	15.12	9.53	0.17	-0.41	39.36	0.00	15.45	0.00	104.71	43.73
-	-	20.39	28.64	21.67	13.78	0.44	-0.68	59.28	0.00	18.17	0.00	148.59	62.13
2	24	20.39	28.64	21.89	14.02	0.51	-0.65	59.04	0.00	18.12	0.00	148.57	62.39
-	-	25.58	35.94	27.76	17.91	0.86	-0.92	79.38	0.00	22.68	0.00	192.21	78.53
2	25	25.58	35.94	27.96	18.13	0.92	-0.90	79.17	0.00	22.63	0.00	192.20	78.76
-	-	29.98	42.12	33.06	21.57	1.29	-1.14	92.60	0.00	26.47	0.00	225.53	92.53
2	26	29.98	42.12	33.23	21.75	1.34	-1.12	92.44	0.00	26.43	0.00	225.54	92.73
-	-	33.58	47.18	37.50	24.67	1.70	-1.34	96.04	0.00	29.55	0.00	245.54	104.08
2	27	33.58	47.18	37.64	24.82	1.74	-1.32	95.87	0.00	29.51	0.00	245.51	104.25
-	-	36.38	51.11	41.01	27.14	2.05	-1.50	111.87	0.00	31.93	0.00	274.34	113.12
2	28	36.38	51.11	41.11	27.25	2.08	-1.49	111.74	0.00	31.90	0.00	274.32	113.25
-	-	38.38	53.92	43.55	28.94	2.32	-1.62	115.50	0.00	33.62	0.00	287.28	119.61
2	29	38.38	53.92	43.62	29.02	2.34	-1.61	115.43	0.00	33.60	0.00	287.27	119.70
-	-	39.57	55.60	45.09	30.05	2.49	-1.69	114.47	0.00	34.63	0.00	291.85	123.53
2	30	39.57	55.60	45.12	30.09	2.50	-1.69	114.44	0.00	34.62	0.00	291.86	123.57

innova Prestest, S.L.

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

Ing. Antonio N. Pangrazio
Director de Fiscalización

PRETEC

PUENTE LONGITUD 20m.

Viga	Tramo	Peso Propio Viga	Peso Propio Losa	C.P. MAX.	C.P. MIN.	S.C. MAX.	S.C. MIN.	Camión AASHTO MAX.	Camión AASHTO MIN.	Carril MAX.	Carril MIN.	TOTAL MAX.	TOTAL MIN.
-	-	39.97	56.16	45.62	30.43	2.55	-1.71	121.03	0.00	34.96	0.00	300.29	124.85
2	31	39.97	56.16	45.62	30.43	2.55	-1.71	120.99	0.00	34.96	0.00	300.26	124.85
-	-	39.57	55.60	45.12	30.09	2.50	-1.69	115.77	0.00	34.62	0.00	293.19	123.57
2	32	39.57	55.60	45.09	30.05	2.49	-1.69	115.79	0.00	34.63	0.00	293.17	123.53
-	-	38.38	53.92	43.62	29.02	2.34	-1.61	112.25	0.00	33.60	0.00	284.10	119.70
2	33	38.38	53.92	43.55	28.94	2.32	-1.62	112.36	0.00	33.62	0.00	284.13	119.61
-	-	36.38	51.11	41.11	27.25	2.08	-1.49	108.08	0.00	31.90	0.00	270.65	113.25
2	34	36.38	51.11	41.01	27.14	2.05	-1.50	108.19	0.00	31.93	0.00	270.65	113.12
-	-	33.58	47.18	37.64	24.82	1.74	-1.32	105.58	0.00	29.51	0.00	255.22	104.25
2	35	33.58	47.18	37.50	24.67	1.70	-1.34	105.74	0.00	29.55	0.00	255.24	104.08
-	-	29.98	42.12	33.23	21.75	1.34	-1.12	93.55	0.00	26.43	0.00	226.65	92.73
2	36	29.98	42.12	33.06	21.57	1.29	-1.14	93.75	0.00	26.47	0.00	226.68	92.53
-	-	25.58	35.94	27.96	18.13	0.92	-0.90	78.36	0.00	22.63	0.00	191.39	78.76
2	37	25.58	35.94	27.76	17.91	0.86	-0.92	78.55	0.00	22.68	0.00	191.38	78.53
-	-	20.39	28.64	21.89	14.02	0.51	-0.65	71.53	0.00	18.12	0.00	161.07	62.39
2	38	20.39	28.64	21.67	13.78	0.44	-0.68	71.76	0.00	18.17	0.00	161.07	62.13
-	-	14.39	20.22	15.12	9.53	0.17	-0.41	49.23	0.00	15.45	0.00	114.58	43.73
2	39	14.39	20.22	14.88	9.27	0.09	-0.43	49.50	0.00	15.56	0.00	114.64	43.45
-	-	7.60	10.67	7.79	4.83	0.00	-0.20	24.53	0.00	8.27	0.00	58.86	22.89
2	40	7.60	10.67	7.54	4.56	0.00	-0.31	24.82	0.00	8.39	0.00	59.01	22.51
-	-	-0.00	0.00	0.14	0.13	0.05	0.00	0.05	-0.16	0.01	-0.05	0.26	-0.08
3	41	-0.00	0.00	0.14	0.13	0.05	0.00	0.05	-0.15	0.02	-0.07	0.26	-0.10
-	-	7.60	10.67	7.54	4.56	0.00	-0.31	20.24	0.00	8.52	0.00	54.57	22.51
3	42	7.60	10.67	7.79	4.83	0.00	-0.20	19.96	0.00	8.38	0.00	54.39	22.89
-	-	14.39	20.22	14.88	9.27	0.09	-0.43	39.63	0.00	15.75	0.00	104.97	43.45
3	43	14.39	20.22	15.12	9.53	0.17	-0.41	39.36	0.00	15.61	0.00	104.87	43.73
-	-	20.39	28.64	21.67	13.78	0.44	-0.68	59.28	0.00	21.90	0.00	152.32	62.13
3	44	20.39	28.64	21.89	14.02	0.51	-0.65	59.04	0.00	21.77	0.00	152.23	62.39
-	-	25.58	35.94	27.76	17.91	0.86	-0.92	79.38	0.00	27.07	0.00	196.60	78.53
3	45	25.58	35.94	27.96	18.13	0.92	-0.90	79.17	0.00	26.96	0.00	196.53	78.76
-	-	29.98	42.12	33.06	21.57	1.29	-1.14	92.60	0.00	31.33	0.00	230.39	92.53
3	46	29.98	42.12	33.23	21.75	1.34	-1.12	92.44	0.00	31.23	0.00	230.34	92.73
-	-	33.58	47.18	37.50	24.67	1.70	-1.34	96.04	0.00	34.74	0.00	250.73	104.08
3	47	33.58	47.18	37.64	24.82	1.74	-1.32	95.87	0.00	34.66	0.00	250.66	104.25
-	-	36.38	51.11	41.01	27.14	2.05	-1.50	111.87	0.00	37.34	0.00	279.75	113.12
3	48	36.38	51.11	41.11	27.25	2.08	-1.49	111.74	0.00	37.28	0.00	279.70	113.25
-	-	38.38	53.92	43.55	28.94	2.32	-1.62	115.50	0.00	39.18	0.00	292.83	119.61
3	49	38.38	53.92	43.62	29.02	2.34	-1.61	115.43	0.00	39.14	0.00	292.81	119.70
-	-	39.57	55.60	45.09	30.05	2.49	-1.69	114.47	0.00	40.26	0.00	297.48	123.53
3	50	39.57	55.60	45.12	30.09	2.50	-1.69	114.44	0.00	40.24	0.00	297.48	123.57
-	-	39.97	56.16	45.62	30.43	2.55	-1.71	121.03	0.00	40.62	0.00	305.94	124.85
3	51	39.97	56.16	45.62	30.43	2.55	-1.71	120.99	0.00	40.62	0.00	305.91	124.85
-	-	39.57	55.60	45.12	30.09	2.50	-1.69	115.77	0.00	40.24	0.00	298.81	123.57
3	52	39.57	55.60	45.09	30.05	2.49	-1.69	115.79	0.00	40.26	0.00	298.80	123.53
-	-	38.38	53.92	43.62	29.02	2.34	-1.61	112.25	0.00	39.14	0.00	289.63	119.70
3	53	38.38	53.92	43.55	28.94	2.32	-1.62	112.36	0.00	39.18	0.00	289.69	119.61
-	-	36.38	51.11	41.11	27.25	2.08	-1.49	108.08	0.00	37.28	0.00	276.03	113.25
3	54	36.38	51.11	41.01	27.14	2.05	-1.50	108.19	0.00	37.34	0.00	276.07	113.12
-	-	33.58	47.18	37.64	24.82	1.74	-1.32	105.58	0.00	34.66	0.00	260.37	104.25
3	55	33.58	47.18	37.50	24.67	1.70	-1.34	105.74	0.00	34.74	0.00	260.43	104.08
-	-	29.98	42.12	33.23	21.75	1.34	-1.12	93.55	0.00	31.23	0.00	231.46	92.73
3	56	29.98	42.12	33.06	21.57	1.29	-1.14	93.75	0.00	31.33	0.00	231.54	92.53
-	-	25.58	35.94	27.96	18.13	0.92	-0.90	78.36	0.00	26.96	0.00	195.72	78.76
3	57	25.58	35.94	27.76	17.91	0.86	-0.92	78.55	0.00	27.07	0.00	195.77	78.53
-	-	20.39	28.64	21.89	14.02	0.51	-0.65	71.53	0.00	21.77	0.00	164.72	62.39
3	58	20.39	28.64	21.67	13.78	0.44	-0.68	71.76	0.00	21.90	0.00	164.80	62.13
-	-	14.39	20.22	15.12	9.53	0.17	-0.41	49.23	0.00	15.61	0.00	114.74	43.73
3	59	14.39	20.22	14.88	9.27	0.09	-0.43	49.50	0.00	15.75	0.00	114.83	43.45

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

Innova Precast, S.A.
Ing. Antonio F. Pangrazio
Director de Fiscalización

Viga	Tramo	Peso Propio	Peso Propio	C.P.	C.P.	S.C.	S.C.	Camión AASHTO	Camión AASHTO	Carril	Carril	TOTAL	TOTAL
		Viga	Losa	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.
-	-	7.60	10.67	7.79	4.83	0.00	-0.20	24.53	0.00	8.38	0.00	58.96	22.89
3	60	7.60	10.67	7.54	4.56	0.00	-0.31	24.82	0.00	8.52	0.00	59.15	22.51
-	-	0.00	0.00	0.14	0.13	0.05	0.00	0.05	-0.16	0.02	-0.07	0.27	-0.10
4	61	-0.00	0.00	-0.13	-0.14	0.00	-0.05	0.19	-0.09	0.07	-0.01	0.13	-0.29
-	-	7.60	11.56	16.29	14.30	3.68	-0.17	15.98	-1.05	4.25	-0.38	59.35	31.85
4	62	7.60	11.56	16.04	14.03	3.58	-0.17	15.88	-0.88	4.24	-0.34	58.90	31.79
-	-	14.39	21.90	30.28	26.45	6.74	-0.33	31.30	-1.85	8.11	-0.71	112.72	59.85
4	63	14.39	21.90	30.04	26.19	6.64	-0.33	31.39	-1.69	8.10	-0.66	112.46	59.79
-	-	20.39	31.03	42.30	36.83	9.32	-0.48	46.69	-2.55	11.57	-1.01	161.30	84.20
4	64	20.39	31.03	42.08	36.59	9.23	-0.49	46.77	-2.40	11.56	-0.97	161.06	84.16
-	-	25.58	38.94	52.51	45.59	11.47	-0.62	61.84	-3.16	14.62	-1.28	204.96	105.05
4	65	25.58	38.94	52.32	45.38	11.39	-0.63	61.92	-3.02	14.60	-1.24	204.76	105.01
-	-	29.98	45.63	61.01	52.85	13.24	-0.75	72.94	-3.69	17.22	-1.52	240.02	122.51
4	66	29.98	45.63	60.84	52.66	13.17	-0.75	73.01	-3.57	17.21	-1.49	239.84	122.47
-	-	33.58	51.11	67.86	58.68	14.65	-0.85	80.51	-4.12	19.37	-1.72	267.07	136.67
4	67	33.58	51.11	67.73	58.53	14.59	-0.86	80.55	-4.02	19.36	-1.70	266.91	136.64
-	-	36.38	55.37	73.14	63.15	15.72	-0.94	91.73	-4.46	21.05	-1.89	293.39	147.61
4	68	36.38	55.37	73.03	63.04	15.68	-0.94	91.76	-4.39	21.04	-1.87	293.26	147.59
-	-	38.38	58.41	76.87	66.31	16.48	-1.00	95.93	-4.69	22.26	-2.01	308.32	155.39
4	69	38.38	58.41	76.80	66.23	16.45	-1.00	95.94	-4.64	22.25	-1.99	308.23	155.38
-	-	39.57	60.24	79.09	68.18	16.92	-1.04	96.79	-4.81	22.98	-2.08	315.60	160.06
4	70	39.57	60.24	79.05	68.14	16.91	-1.04	96.80	-4.79	22.98	-2.07	315.55	160.06
-	-	39.97	60.84	79.82	68.79	17.07	-1.05	100.11	-4.82	23.23	-2.10	321.04	161.64
4	71	39.97	60.84	79.82	68.79	17.07	-1.05	100.10	-4.82	23.23	-2.10	321.03	161.64
-	-	39.57	60.24	79.05	68.14	16.91	-1.04	97.13	-4.75	22.98	-2.07	315.89	160.10
4	72	39.57	60.24	79.09	68.18	16.92	-1.04	97.11	-4.77	22.98	-2.08	315.92	160.11
-	-	38.38	58.41	76.80	66.23	16.45	-1.00	93.80	-4.63	22.25	-1.99	306.09	155.39
4	73	38.38	58.41	76.87	66.31	16.48	-1.00	93.80	-4.68	22.26	-2.01	306.19	155.41
-	-	36.38	55.37	73.03	63.04	15.68	-0.94	89.79	-4.40	21.04	-1.87	291.29	147.57
4	74	36.38	55.37	73.14	63.15	15.72	-0.94	89.77	-4.48	21.05	-1.89	291.43	147.60
-	-	33.58	51.11	67.73	58.53	14.59	-0.86	85.41	-4.06	19.36	-1.70	271.77	136.60
4	75	33.58	51.11	67.86	58.68	14.65	-0.85	85.37	-4.16	19.37	-1.72	271.93	136.63
-	-	29.98	45.63	60.84	52.66	13.17	-0.75	75.36	-3.62	17.21	-1.49	242.19	122.42
4	76	29.98	45.63	61.01	52.85	13.24	-0.75	75.31	-3.74	17.22	-1.52	242.39	122.46
-	-	25.58	38.94	52.32	45.38	11.39	-0.63	61.17	-3.07	14.60	-1.24	204.00	104.95
4	77	25.58	38.94	52.51	45.59	11.47	-0.62	61.09	-3.21	14.62	-1.28	204.21	105.00
-	-	20.39	31.03	42.08	36.59	9.23	-0.49	53.55	-2.44	11.56	-0.97	167.84	84.11
4	78	20.39	31.03	42.30	36.83	9.32	-0.48	53.69	-2.60	11.57	-1.01	168.29	84.16
-	-	14.39	21.90	30.04	26.19	6.64	-0.33	36.87	-1.73	8.10	-0.66	117.95	59.76
4	79	14.39	21.90	30.28	26.45	6.74	-0.33	37.02	-1.89	8.11	-0.71	118.44	59.82
-	-	7.60	11.56	16.04	14.03	3.58	-0.17	18.48	-0.90	4.24	-0.34	61.49	31.77
4	80	7.60	11.56	16.29	14.30	3.68	-0.17	18.63	-1.07	4.25	-0.38	62.01	31.83
-	-	-0.00	-0.00	-0.13	-0.14	0.00	-0.05	0.19	-0.09	0.07	-0.01	0.13	-0.29

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

Ing. Antonio M. Pangrazio
Director de Fiscalización

Envolvente Barras Transversales

Envolvente de cortantes (t/m) (E.L.S.)

Barra	Nudo	C.P.	C.P.	S.C.	S.C.	Camión AASHTO	Camión AASHTO	TOTAL	TOTAL
		MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.
121	1	0.106	0.105	0.036	0.000	0.111	-0.127	0.254	-0.022
121	2	1.273	1.218	0.396	0.000	0.334	-0.127	2.003	1.092
122	2	-1.472	-1.560	0.000	-0.405	1.213	-1.035	-0.259	-3.000
122	3	-0.552	-0.800	0.000	-0.405	1.599	-0.432	1.047	-1.637
123	3	-0.336	-0.504	0.016	-0.016	0.529	-1.031	0.209	-1.551
123	4	0.504	0.336	0.016	-0.016	1.161	-0.546	1.681	-0.227
124	4	0.800	0.552	0.405	0.000	0.432	-1.593	1.637	-1.041
124	5	1.560	1.472	0.405	0.000	0.841	-1.194	2.806	0.278
125	5	-1.218	-1.273	0.000	-0.396	0.124	-0.090	-1.095	-1.759
125	6	-0.105	-0.106	0.000	-0.036	0.124	-0.090	0.019	-0.232
126	7	0.138	0.128	0.051	0.000	0.111	-0.226	0.300	-0.098
126	8	1.296	1.250	0.411	0.000	0.334	-0.226	2.041	1.024
127	8	-1.040	-1.163	0.007	-0.248	0.472	-0.702	-0.561	-2.114
127	9	-0.155	-0.368	0.007	-0.248	1.031	-0.201	0.882	-0.817
128	9	-0.336	-0.504	0.024	-0.024	0.075	-0.487	-0.237	-1.015
128	10	0.504	0.336	0.024	-0.024	0.735	-0.101	1.263	0.211
129	10	0.368	0.155	0.248	-0.007	0.201	-0.926	0.817	-0.777
129	11	1.163	1.040	0.248	-0.007	0.611	-0.481	2.022	0.552
130	11	-1.250	-1.296	0.000	-0.411	0.217	-0.079	-1.032	-1.786
130	12	-0.128	-0.138	0.000	-0.051	0.217	-0.079	0.090	-0.268
131	13	0.054	0.049	0.020	0.000	0.041	-0.094	0.116	-0.045
131	14	1.217	1.166	0.380	0.000	0.264	-0.094	1.862	1.072
132	14	-0.794	-0.938	0.011	-0.159	0.151	-0.600	-0.632	-1.697
132	15	0.070	-0.122	0.011	-0.159	0.777	-0.140	0.859	-0.422
133	15	-0.336	-0.504	0.006	-0.006	0.150	-0.588	-0.180	-1.098
133	16	0.504	0.336	0.006	-0.006	0.806	-0.170	1.316	0.160
134	16	0.122	-0.070	0.159	-0.011	0.140	-0.582	0.422	-0.664
134	17	0.938	0.794	0.159	-0.011	0.568	-0.188	1.665	0.596
135	17	-1.166	-1.217	0.000	-0.380	0.090	-0.029	-1.076	-1.626
135	18	-0.049	-0.054	0.000	-0.020	0.090	-0.029	0.041	-0.103
136	19	0.004	0.003	0.002	0.000	0.008	-0.017	0.014	-0.013
136	20	1.171	1.116	0.362	0.000	0.231	-0.017	1.764	1.099
137	20	-0.635	-0.792	0.014	-0.102	0.139	-0.690	-0.482	-1.584
137	21	0.216	0.037	0.014	-0.102	0.730	-0.248	0.961	-0.313
138	21	-0.336	-0.504	0.016	-0.016	0.253	-0.669	-0.068	-1.189
138	22	0.504	0.336	0.016	-0.016	0.869	-0.245	1.389	0.075
139	22	-0.037	-0.216	0.102	-0.014	0.255	-0.554	0.320	-0.785
139	23	0.792	0.635	0.102	-0.014	0.697	-0.142	1.591	0.479
140	23	-1.116	-1.171	0.000	-0.362	0.016	-0.008	-1.100	-1.541
140	24	-0.003	-0.004	0.000	-0.002	0.016	-0.008	0.013	-0.014
141	25	-0.019	-0.020	0.000	-0.007	0.035	-0.019	0.016	-0.045
141	26	1.149	1.092	0.353	-0.000	0.245	-0.014	1.747	1.079
142	26	-0.523	-0.689	0.017	-0.062	0.147	-0.869	-0.359	-1.620
142	27	0.319	0.149	0.017	-0.062	0.704	-0.338	1.040	-0.252
143	27	-0.336	-0.504	0.035	-0.035	0.343	-0.830	0.042	-1.369
143	28	0.504	0.336	0.035	-0.035	0.915	-0.315	1.454	-0.014
144	28	-0.149	-0.319	0.062	-0.017	0.377	-0.542	0.291	-0.878
144	29	0.689	0.523	0.062	-0.017	0.807	-0.155	1.558	0.351
145	29	-1.092	-1.149	0.000	-0.353	0.014	-0.034	-1.078	-1.536
145	30	0.020	0.019	0.007	0.000	0.014	-0.034	0.041	-0.015
146	31	-0.030	-0.032	0.000	-0.012	0.054	-0.027	0.024	-0.071
146	32	1.138	1.080	0.349	-0.000	0.255	-0.019	1.742	1.061
147	32	-0.440	-0.613	0.019	-0.033	0.160	-0.972	-0.261	-1.617
147	33	0.395	0.232	0.019	-0.033	0.686	-0.413	1.100	-0.215

innova Precast, S.L.

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

Ing. Antonio N. Pangrazio
Director de Fiscalización

Barra	Nudo	C.P. MAX.	C.P. MIN.	S.C. MAX.	S.C. MIN.	Camión AASHTO MAX.	Camión AASHTO MIN.	TOTAL MAX.	TOTAL MIN.
148	33	-0.336	-0.504	0.051	-0.051	0.409	-0.900	0.124	-1.455
148	34	0.504	0.336	0.051	-0.051	0.853	-0.365	1.409	-0.080
149	34	-0.232	-0.395	0.033	-0.019	0.476	-0.535	0.277	-0.949
149	35	0.613	0.440	0.033	-0.019	0.899	-0.171	1.545	0.250
150	35	-1.080	-1.138	0.000	-0.349	0.020	-0.052	-1.060	-1.538
150	36	0.032	0.030	0.012	0.000	0.020	-0.052	0.063	-0.022
151	37	-0.036	-0.039	0.000	-0.014	0.064	-0.032	0.028	-0.085
151	38	1.132	1.073	0.346	-0.000	0.260	-0.023	1.739	1.050
152	38	-0.378	-0.555	0.022	-0.011	0.170	-1.057	-0.187	-1.623
152	39	0.453	0.294	0.022	-0.011	0.601	-0.476	1.075	-0.193
153	39	-0.336	-0.504	0.064	-0.064	0.455	-0.948	0.182	-1.515
153	40	0.504	0.336	0.064	-0.064	0.893	-0.398	1.461	-0.125
154	40	-0.294	-0.453	0.011	-0.022	0.557	-0.529	0.274	-1.003
154	41	0.555	0.378	0.011	-0.022	0.975	-0.184	1.542	0.172
155	41	-1.073	-1.132	0.000	-0.346	0.023	-0.062	-1.050	-1.540
155	42	0.039	0.036	0.014	0.000	0.023	-0.062	0.076	-0.026
156	43	-0.040	-0.043	0.000	-0.016	0.072	-0.039	0.032	-0.097
156	44	1.128	1.069	0.345	-0.001	0.264	-0.028	1.737	1.040
157	44	-0.331	-0.513	0.028	0.000	0.176	-1.120	-0.128	-1.633
157	45	0.495	0.341	0.028	0.000	0.605	-0.522	1.128	-0.181
158	45	-0.336	-0.504	0.073	-0.073	0.503	-0.997	0.240	-1.574
158	46	0.504	0.336	0.073	-0.073	0.936	-0.435	1.513	-0.173
159	46	-0.341	-0.495	0.000	-0.028	0.616	-0.522	0.275	-1.045
159	47	0.513	0.331	0.000	-0.028	1.032	-0.193	1.545	0.110
160	47	-1.069	-1.128	0.001	-0.345	0.029	-0.069	-1.040	-1.542
160	48	0.043	0.040	0.016	0.000	0.029	-0.069	0.088	-0.029
161	49	-0.042	-0.045	0.000	-0.017	0.077	-0.040	0.034	-0.102
161	50	1.126	1.067	0.344	-0.001	0.267	-0.029	1.737	1.037
162	50	-0.299	-0.483	0.040	0.000	0.185	-1.162	-0.074	-1.646
162	51	0.525	0.373	0.040	0.000	0.613	-0.553	1.178	-0.180
163	51	-0.336	-0.504	0.080	-0.080	0.535	-1.031	0.279	-1.614
163	52	0.504	0.336	0.080	-0.080	0.965	-0.461	1.548	-0.204
164	52	-0.373	-0.525	0.000	-0.040	0.656	-0.522	0.283	-1.087
164	53	0.483	0.299	0.000	-0.040	1.070	-0.204	1.553	0.055
165	53	-1.067	-1.126	0.001	-0.344	0.030	-0.074	-1.036	-1.544
165	54	0.045	0.042	0.017	0.000	0.030	-0.074	0.092	-0.032
166	55	-0.044	-0.047	0.000	-0.017	0.079	-0.040	0.035	-0.104
166	56	1.124	1.065	0.343	-0.001	0.268	-0.028	1.736	1.036
167	56	-0.280	-0.466	0.047	0.000	0.188	-1.185	-0.044	-1.651
167	57	0.542	0.392	0.047	0.000	0.616	-0.569	1.206	-0.176
168	57	-0.336	-0.504	0.083	-0.083	0.550	-1.046	0.297	-1.634
168	58	0.504	0.336	0.083	-0.083	0.977	-0.471	1.565	-0.218
169	58	-0.392	-0.542	0.000	-0.047	0.677	-0.520	0.284	-1.110
169	59	0.466	0.280	0.000	-0.047	1.198	-0.208	1.663	0.024
170	59	-1.065	-1.124	0.001	-0.343	0.029	-0.076	-1.035	-1.544
170	60	0.047	0.044	0.017	0.000	0.029	-0.076	0.094	-0.033
171	61	-0.044	-0.047	0.000	-0.018	0.079	-0.044	0.035	-0.109
171	62	1.124	1.065	0.343	-0.001	0.268	-0.032	1.735	1.032
172	62	-0.273	-0.460	0.050	0.000	0.187	-1.188	-0.036	-1.648
172	63	0.548	0.399	0.050	0.000	0.615	-0.569	1.213	-0.171
173	63	-0.336	-0.504	0.084	-0.084	0.550	-1.047	0.298	-1.635
173	64	0.504	0.336	0.084	-0.084	0.977	-0.470	1.565	-0.218
174	64	-0.399	-0.548	0.000	-0.050	0.679	-0.517	0.281	-1.116
174	65	0.460	0.273	0.000	-0.050	1.202	-0.208	1.662	0.016
175	65	-1.065	-1.124	0.001	-0.343	0.033	-0.076	-1.031	-1.544
175	66	0.047	0.044	0.018	0.000	0.033	-0.076	0.098	-0.032
176	67	-0.044	-0.047	0.000	-0.017	0.079	-0.041	0.035	-0.105
176	68	1.124	1.065	0.343	-0.001	0.268	-0.030	1.736	1.035

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

innova Precast, S.L.
Ing. Antonio [illegible] Pangrazio
Director de Fiscalización

Barra	Nudo	C.P. MAX.	C.P. MIN.	S.C. MAX.	S.C. MIN.	Camión AASHTO MAX.	Camión AASHTO MIN.	TOTAL MAX.	TOTAL MIN.
177	68	-0.280	-0.466	0.047	0.000	0.188	-1.182	-0.044	-1.648
177	69	0.542	0.392	0.047	0.000	0.616	-0.565	1.206	-0.173
178	69	-0.336	-0.504	0.083	-0.083	0.549	-1.045	0.296	-1.632
178	70	0.504	0.336	0.083	-0.083	0.976	-0.470	1.564	-0.217
179	70	-0.392	-0.542	0.000	-0.047	0.674	-0.520	0.281	-1.110
179	71	0.466	0.280	0.000	-0.047	1.195	-0.208	1.660	0.024
180	71	-1.065	-1.124	0.001	-0.343	0.031	-0.076	-1.034	-1.544
180	72	0.047	0.044	0.017	0.000	0.031	-0.076	0.095	-0.033
181	73	-0.042	-0.045	0.000	-0.017	0.077	-0.041	0.034	-0.104
181	74	1.126	1.067	0.344	-0.001	0.267	-0.030	1.737	1.036
182	74	-0.299	-0.483	0.040	0.000	0.187	-1.164	-0.071	-1.647
182	75	0.525	0.373	0.040	0.000	0.616	-0.555	1.181	-0.181
183	75	-0.336	-0.504	0.080	-0.080	0.539	-1.034	0.282	-1.618
183	76	0.504	0.336	0.080	-0.080	0.968	-0.464	1.552	-0.208
184	76	-0.373	-0.525	0.000	-0.040	0.657	-0.524	0.284	-1.089
184	77	0.483	0.299	0.000	-0.040	1.071	-0.206	1.554	0.052
185	77	-1.067	-1.126	0.001	-0.344	0.031	-0.074	-1.035	-1.544
185	78	0.045	0.042	0.017	0.000	0.031	-0.074	0.093	-0.032
186	79	-0.040	-0.043	0.000	-0.016	0.072	-0.036	0.033	-0.094
186	80	1.128	1.069	0.345	-0.001	0.265	-0.025	1.738	1.044
187	80	-0.331	-0.513	0.028	0.000	0.182	-1.126	-0.122	-1.639
187	81	0.495	0.341	0.028	0.000	0.611	-0.529	1.134	-0.188
188	81	-0.336	-0.504	0.073	-0.073	0.514	-1.009	0.251	-1.586
188	82	0.504	0.336	0.073	-0.073	0.947	-0.447	1.524	-0.184
189	82	-0.341	-0.495	0.000	-0.028	0.623	-0.528	0.282	-1.051
189	83	0.513	0.331	0.000	-0.028	1.038	-0.199	1.551	0.104
190	83	-1.069	-1.128	0.001	-0.345	0.026	-0.070	-1.043	-1.543
190	84	0.043	0.040	0.016	0.000	0.026	-0.070	0.084	-0.030
191	85	-0.036	-0.039	0.000	-0.014	0.065	-0.035	0.029	-0.087
191	86	1.132	1.073	0.346	-0.000	0.261	-0.025	1.740	1.048
192	86	-0.378	-0.555	0.022	-0.011	0.172	-1.068	-0.185	-1.635
192	87	0.453	0.294	0.022	-0.011	0.603	-0.487	1.077	-0.204
193	87	-0.336	-0.504	0.064	-0.064	0.474	-0.967	0.202	-1.535
193	88	0.504	0.336	0.064	-0.064	0.912	-0.417	1.480	-0.145
194	88	-0.294	-0.453	0.011	-0.022	0.568	-0.531	0.285	-1.005
194	89	0.555	0.378	0.011	-0.022	0.986	-0.186	1.553	0.170
195	89	-1.073	-1.132	0.000	-0.346	0.026	-0.063	-1.047	-1.541
195	90	0.039	0.036	0.014	0.000	0.026	-0.063	0.079	-0.027
196	91	-0.030	-0.032	0.000	-0.012	0.054	-0.029	0.024	-0.072
196	92	1.138	1.080	0.349	-0.000	0.255	-0.021	1.742	1.059
197	92	-0.440	-0.613	0.019	-0.033	0.161	-0.989	-0.260	-1.635
197	93	0.395	0.232	0.019	-0.033	0.687	-0.431	1.101	-0.232
198	93	-0.336	-0.504	0.051	-0.051	0.415	-0.906	0.130	-1.461
198	94	0.504	0.336	0.051	-0.051	0.859	-0.371	1.414	-0.086
199	94	-0.232	-0.395	0.033	-0.019	0.493	-0.536	0.294	-0.951
199	95	0.613	0.440	0.033	-0.019	0.916	-0.173	1.562	0.248
200	95	-1.080	-1.138	0.000	-0.349	0.022	-0.052	-1.058	-1.539
200	96	0.032	0.030	0.012	0.000	0.022	-0.052	0.065	-0.022
201	97	-0.019	-0.020	0.000	-0.007	0.035	-0.018	0.016	-0.045
201	98	1.149	1.092	0.353	-0.000	0.245	-0.013	1.747	1.079
202	98	-0.523	-0.689	0.017	-0.062	0.151	-0.883	-0.356	-1.634
202	99	0.319	0.149	0.017	-0.062	0.707	-0.352	1.043	-0.265
203	99	-0.336	-0.504	0.035	-0.035	0.350	-0.837	0.049	-1.376
203	100	0.504	0.336	0.035	-0.035	0.922	-0.322	1.461	-0.021
204	100	-0.149	-0.319	0.062	-0.017	0.391	-0.546	0.304	-0.882
204	101	0.689	0.523	0.062	-0.017	0.821	-0.159	1.572	0.348
205	101	-1.092	-1.149	0.000	-0.353	0.014	-0.034	-1.078	-1.536
205	102	0.020	0.019	0.007	0.000	0.014	-0.034	0.041	-0.015

innova Precast S.L.

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

Ing. Antonio M. Pangrazio
Director de Fiscalización

Barra	Nudo	C.P.	C.P.	S.C.	S.C.	Camión AASHTO	Camión AASHTO	TOTAL	TOTAL
		MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.
206	103	0.004	0.003	0.002	0.000	0.008	-0.019	0.014	-0.015
206	104	1.171	1.116	0.362	0.000	0.231	-0.019	1.764	1.098
207	104	-0.635	-0.792	0.014	-0.102	0.144	-0.700	-0.477	-1.594
207	105	0.216	0.037	0.014	-0.102	0.735	-0.258	0.965	-0.324
208	105	-0.336	-0.504	0.016	-0.016	0.268	-0.685	-0.052	-1.204
208	106	0.504	0.336	0.016	-0.016	0.885	-0.260	1.404	0.060
209	106	-0.037	-0.216	0.102	-0.014	0.265	-0.559	0.330	-0.790
209	107	0.792	0.635	0.102	-0.014	0.708	-0.147	1.602	0.474
210	107	-1.116	-1.171	0.000	-0.362	0.018	-0.008	-1.098	-1.541
210	108	-0.003	-0.004	0.000	-0.002	0.018	-0.008	0.015	-0.014
211	109	0.054	0.049	0.020	0.000	0.041	-0.094	0.115	-0.045
211	110	1.217	1.166	0.380	0.000	0.264	-0.094	1.862	1.072
212	110	-0.794	-0.938	0.011	-0.159	0.156	-0.610	-0.627	-1.708
212	111	0.070	-0.122	0.011	-0.159	0.782	-0.150	0.863	-0.432
213	111	-0.336	-0.504	0.006	-0.006	0.165	-0.603	-0.165	-1.113
213	112	0.504	0.336	0.006	-0.006	0.821	-0.186	1.331	0.144
214	112	0.122	-0.070	0.159	-0.011	0.150	-0.587	0.432	-0.668
214	113	0.938	0.794	0.159	-0.011	0.578	-0.192	1.676	0.591
215	113	-1.166	-1.217	0.000	-0.380	0.090	-0.029	-1.076	-1.627
215	114	-0.049	-0.054	0.000	-0.020	0.090	-0.029	0.041	-0.103
216	115	0.138	0.128	0.051	0.000	0.111	-0.228	0.300	-0.100
216	116	1.296	1.250	0.411	0.000	0.334	-0.228	2.041	1.022
217	116	-1.040	-1.163	0.007	-0.248	0.475	-0.704	-0.558	-2.115
217	117	-0.155	-0.368	0.007	-0.248	1.034	-0.203	0.885	-0.818
218	117	-0.336	-0.504	0.024	-0.024	0.075	-0.487	-0.237	-1.015
218	118	0.504	0.336	0.024	-0.024	0.735	-0.101	1.263	0.211
219	118	0.368	0.155	0.248	-0.007	0.203	-0.929	0.818	-0.781
219	119	1.163	1.040	0.248	-0.007	0.613	-0.485	2.024	0.548
220	119	-1.250	-1.296	0.000	-0.411	0.219	-0.079	-1.030	-1.786
220	120	-0.128	-0.138	0.000	-0.051	0.219	-0.079	0.092	-0.268
221	121	0.106	0.105	0.036	0.000	0.112	-0.128	0.254	-0.023
221	122	1.273	1.218	0.396	0.000	0.335	-0.128	2.004	1.090
222	122	-1.472	-1.560	0.000	-0.405	1.223	-1.034	-0.249	-2.999
222	123	-0.552	-0.800	0.000	-0.405	1.609	-0.431	1.057	-1.636
223	123	-0.336	-0.504	0.016	-0.016	0.537	-1.039	0.217	-1.559
223	124	0.504	0.336	0.016	-0.016	1.169	-0.554	1.689	-0.235
224	124	0.800	0.552	0.405	0.000	0.431	-1.603	1.636	-1.051
224	125	1.560	1.472	0.405	0.000	0.840	-1.204	2.805	0.268
225	125	-1.218	-1.273	0.000	-0.396	0.125	-0.091	-1.093	-1.760
225	126	-0.105	-0.106	0.000	-0.036	0.125	-0.091	0.020	-0.233

Envolvente de flectores (t.m/m) (E.L.S.)

Barra	Nudo	C.P.	C.P.	S.C.	S.C.	Camión AASHTO	Camión AASHTO	TOTAL	TOTAL
		MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.
121	1	-0.072	-0.081	0.000	-0.033	0.163	-0.057	0.091	-0.171
121	0	-0.568	-0.578	0.000	-0.146	0.252	-0.132	-0.316	-0.857
121	2	-1.352	-1.353	0.000	-0.407	0.340	-0.277	-1.012	-2.037
122	2	-2.015	-2.081	0.000	-0.687	1.667	-0.850	-0.347	-3.618
122	0	-0.445	-0.516	0.000	-0.201	1.636	-0.041	1.191	-0.757
122	3	0.645	0.519	0.298	-0.012	0.563	-1.311	1.506	-0.804
123	3	-0.005	-0.078	0.039	-0.000	0.604	-0.846	0.637	-0.924
123	0	0.225	0.196	0.038	0.000	1.706	-0.083	1.970	0.114
123	4	-0.005	-0.078	0.039	-0.000	0.604	-0.733	0.638	-0.811
124	4	0.645	0.519	0.298	-0.012	0.491	-1.211	1.434	-0.704
124	0	-0.445	-0.516	0.000	-0.201	1.662	-0.041	1.216	-0.757
124	5	-2.015	-2.081	0.000	-0.687	1.608	-0.557	-0.406	-3.325
125	5	-1.352	-1.353	0.000	-0.407	0.330	-0.159	-1.023	-1.919

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

innova Precast S.L.
Ing. Antonio M. Pangrazio
Director de Fiscalización

Barra	Nudo	C.P. MAX.	C.P. MIN.	S.C. MAX.	S.C. MIN.	Camión AASHTO MAX.	Camión AASHTO MIN.	TOTAL MAX.	TOTAL MIN.
125	0	-0.568	-0.578	0.000	-0.146	0.243	-0.097	-0.325	-0.821
125	6	-0.072	-0.081	0.000	-0.033	0.156	-0.040	0.084	-0.153
126	7	-0.023	-0.025	0.000	-0.009	0.042	-0.019	0.019	-0.054
126	0	-0.535	-0.544	0.000	-0.134	0.200	-0.097	-0.335	-0.774
126	8	-1.335	-1.340	0.000	-0.405	0.358	-0.242	-0.977	-1.987
127	8	-1.551	-1.576	0.000	-0.495	0.763	-0.410	-0.788	-2.482
127	0	-0.458	-0.530	0.000	-0.206	0.496	-0.042	0.038	-0.778
127	9	0.113	0.031	0.106	-0.023	0.244	-0.407	0.464	-0.399
128	9	-0.093	-0.158	0.031	-0.026	0.187	-0.258	0.124	-0.442
128	0	0.144	0.108	0.005	0.000	0.490	-0.085	0.638	0.023
128	10	-0.093	-0.158	0.031	-0.026	0.185	-0.237	0.122	-0.421
129	10	0.113	0.031	0.106	-0.023	0.244	-0.430	0.464	-0.421
129	0	-0.458	-0.530	0.000	-0.206	0.517	-0.043	0.059	-0.779
129	11	-1.551	-1.576	0.000	-0.495	0.733	-0.238	-0.818	-2.309
130	11	-1.335	-1.340	0.000	-0.405	0.344	-0.124	-0.991	-1.869
130	0	-0.535	-0.544	0.000	-0.134	0.192	-0.069	-0.343	-0.746
130	12	-0.023	-0.025	0.000	-0.009	0.040	-0.014	0.017	-0.048
131	13	-0.022	-0.023	0.000	-0.009	0.037	-0.019	0.015	-0.051
131	0	-0.479	-0.483	0.000	-0.111	0.103	-0.047	-0.376	-0.641
131	14	-1.221	-1.224	0.000	-0.361	0.168	-0.142	-1.053	-1.728
132	14	-1.301	-1.304	0.000	-0.393	0.306	-0.199	-0.995	-1.896
132	0	-0.478	-0.553	0.000	-0.215	0.567	-0.091	0.089	-0.859
132	15	-0.204	-0.260	0.000	-0.037	0.390	-0.347	0.186	-0.644
133	15	-0.238	-0.290	0.000	-0.050	0.395	-0.315	0.157	-0.655
133	0	0.012	-0.036	0.000	-0.050	0.678	-0.078	0.690	-0.164
133	16	-0.238	-0.290	0.000	-0.050	0.395	-0.271	0.157	-0.611
134	16	-0.204	-0.260	0.000	-0.037	0.390	-0.314	0.186	-0.611
134	0	-0.478	-0.553	0.000	-0.215	0.582	-0.096	0.104	-0.864
134	17	-1.301	-1.304	0.000	-0.393	0.293	-0.091	-1.008	-1.788
135	17	-1.221	-1.224	0.000	-0.361	0.162	-0.053	-1.059	-1.638
135	0	-0.479	-0.483	0.000	-0.111	0.099	-0.033	-0.380	-0.627
135	18	-0.022	-0.023	0.000	-0.009	0.036	-0.013	0.014	-0.045
136	19	-0.011	-0.012	0.000	-0.004	0.019	-0.010	0.008	-0.026
136	0	-0.436	-0.437	0.000	-0.094	0.030	-0.012	-0.405	-0.543
136	20	-1.140	-1.149	0.000	-0.331	0.042	-0.084	-1.098	-1.564
137	20	-1.145	-1.154	0.000	-0.333	0.064	-0.111	-1.082	-1.598
137	0	-0.507	-0.584	0.000	-0.227	1.180	-0.157	0.674	-0.968
137	21	-0.427	-0.464	0.000	-0.122	0.671	-0.406	0.244	-0.992
138	21	-0.391	-0.431	0.000	-0.108	0.677	-0.450	0.286	-0.989
138	0	-0.128	-0.189	0.000	-0.108	1.499	-0.095	1.371	-0.392
138	22	-0.391	-0.431	0.000	-0.108	0.640	-0.390	0.249	-0.929
139	22	-0.427	-0.464	0.000	-0.122	0.629	-0.332	0.202	-0.918
139	0	-0.507	-0.584	0.000	-0.227	1.188	-0.162	0.681	-0.973
139	23	-1.145	-1.154	0.000	-0.333	0.062	-0.040	-1.083	-1.527
140	23	-1.140	-1.149	0.000	-0.331	0.040	-0.014	-1.100	-1.494
140	0	-0.436	-0.437	0.000	-0.094	0.029	-0.008	-0.407	-0.539
140	24	-0.011	-0.012	0.000	-0.004	0.019	-0.007	0.007	-0.023
141	25	0.001	0.000	0.000	-0.000	0.003	-0.007	0.004	-0.007
141	0	-0.408	-0.409	0.000	-0.083	0.013	-0.030	-0.395	-0.522
141	26	-1.094	-1.107	0.000	-0.314	0.018	-0.102	-1.076	-1.523
142	26	-1.048	-1.065	0.000	-0.296	0.039	-0.195	-1.008	-1.557
142	0	-0.541	-0.622	0.000	-0.242	3.084	-0.214	2.544	-1.077
142	27	-0.598	-0.621	0.000	-0.187	0.920	-0.472	0.322	-1.280
143	27	-0.534	-0.562	0.000	-0.163	0.927	-0.552	0.393	-1.277
143	0	-0.260	-0.333	0.000	-0.163	3.409	-0.111	3.149	-0.607
143	28	-0.534	-0.562	0.000	-0.163	0.917	-0.511	0.383	-1.236
144	28	-0.598	-0.621	0.000	-0.187	0.902	-0.406	0.303	-1.214
144	0	-0.541	-0.622	0.000	-0.242	3.085	-0.219	2.544	-1.083

innova Precast S.L.

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

Ing. Antonio N. Pangrazio
Director de Fiscalizacion

Barra	Nudo	C.P.	C.P.	S.C.	S.C.	Camión AASHTO	Camión AASHTO	TOTAL	TOTAL
		MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.
144	29	-1.048	-1.065	0.000	-0.296	0.039	-0.151	-1.008	-1.513
145	29	-1.094	-1.107	0.000	-0.314	0.019	-0.053	-1.075	-1.474
145	0	-0.408	-0.409	0.000	-0.083	0.010	-0.030	-0.398	-0.521
145	30	0.001	0.000	0.000	-0.000	0.003	-0.007	0.004	-0.007
146	31	0.010	0.009	0.004	0.000	0.008	-0.020	0.021	-0.011
146	0	-0.391	-0.393	0.000	-0.077	0.025	-0.057	-0.365	-0.526
146	32	-1.068	-1.083	0.001	-0.304	0.030	-0.140	-1.038	-1.528
147	32	-0.987	-1.009	0.001	-0.274	0.071	-0.257	-0.914	-1.540
147	0	-0.576	-0.660	0.000	-0.256	2.659	-0.260	2.083	-1.176
147	33	-0.737	-0.748	0.000	-0.240	1.130	-0.528	0.393	-1.516
148	33	-0.660	-0.678	0.000	-0.211	1.136	-0.627	0.476	-1.516
148	0	-0.375	-0.459	0.000	-0.211	3.217	-0.125	2.842	-0.795
148	34	-0.660	-0.678	0.000	-0.211	1.150	-0.602	0.490	-1.490
149	34	-0.737	-0.748	0.000	-0.240	1.132	-0.472	0.395	-1.460
149	0	-0.576	-0.660	0.000	-0.256	2.651	-0.266	2.076	-1.183
149	35	-0.987	-1.009	0.001	-0.274	0.071	-0.242	-0.914	-1.525
150	35	-1.068	-1.083	0.001	-0.304	0.031	-0.091	-1.037	-1.479
150	0	-0.391	-0.393	0.000	-0.077	0.017	-0.055	-0.373	-0.524
150	36	0.010	0.009	0.004	0.000	0.005	-0.019	0.019	-0.010
151	37	0.016	0.014	0.006	0.000	0.012	-0.029	0.033	-0.015
151	0	-0.380	-0.383	0.001	-0.073	0.034	-0.074	-0.345	-0.530
151	38	-1.053	-1.069	0.001	-0.299	0.040	-0.159	-1.012	-1.527
152	38	-0.948	-0.973	0.002	-0.260	0.093	-0.307	-0.852	-1.540
152	0	-0.609	-0.696	0.000	-0.270	1.529	-0.301	0.921	-1.267
152	39	-0.848	-0.850	0.000	-0.282	1.300	-0.570	0.452	-1.702
153	39	-0.766	-0.774	0.000	-0.251	1.302	-0.677	0.537	-1.703
153	0	-0.472	-0.564	0.000	-0.251	1.936	-0.137	1.465	-0.952
153	40	-0.766	-0.774	0.000	-0.251	1.335	-0.665	0.570	-1.691
154	40	-0.848	-0.850	0.000	-0.282	1.319	-0.523	0.471	-1.655
154	0	-0.609	-0.696	0.000	-0.270	1.516	-0.309	0.907	-1.275
154	41	-0.948	-0.973	0.002	-0.260	0.093	-0.302	-0.852	-1.535
155	41	-1.053	-1.069	0.001	-0.299	0.040	-0.115	-1.012	-1.483
155	0	-0.380	-0.383	0.001	-0.073	0.024	-0.071	-0.355	-0.527
155	42	0.016	0.014	0.006	0.000	0.008	-0.028	0.030	-0.014
156	43	0.019	0.018	0.007	0.000	0.015	-0.035	0.041	-0.017
156	0	-0.373	-0.377	0.001	-0.071	0.040	-0.085	-0.332	-0.532
156	44	-1.043	-1.060	0.001	-0.296	0.048	-0.170	-0.994	-1.526
157	44	-0.923	-0.950	0.003	-0.252	0.108	-0.341	-0.811	-1.542
157	0	-0.637	-0.727	0.000	-0.282	3.113	-0.333	2.476	-1.342
157	45	-0.929	-0.934	0.000	-0.315	1.437	-0.613	0.508	-1.862
158	45	-0.849	-0.850	0.000	-0.283	1.443	-0.710	0.594	-1.843
158	0	-0.548	-0.647	0.000	-0.283	3.898	-0.146	3.350	-1.076
158	46	-0.849	-0.850	0.000	-0.283	1.491	-0.733	0.642	-1.866
159	46	-0.929	-0.934	0.000	-0.315	1.470	-0.574	0.542	-1.824
159	0	-0.637	-0.727	0.000	-0.282	3.094	-0.342	2.457	-1.351
159	47	-0.923	-0.950	0.003	-0.252	0.108	-0.343	-0.811	-1.544
160	47	-1.043	-1.060	0.001	-0.296	0.049	-0.130	-0.993	-1.486
160	0	-0.373	-0.377	0.001	-0.071	0.029	-0.082	-0.344	-0.529
160	48	0.019	0.018	0.007	0.000	0.010	-0.034	0.037	-0.016
161	49	0.021	0.020	0.008	0.000	0.017	-0.039	0.046	-0.019
161	0	-0.369	-0.373	0.001	-0.069	0.044	-0.093	-0.325	-0.535
161	50	-1.038	-1.055	0.001	-0.294	0.051	-0.167	-0.985	-1.515
162	50	-0.907	-0.935	0.004	-0.246	0.117	-0.386	-0.786	-1.567
162	0	-0.658	-0.750	0.000	-0.291	3.075	-0.355	2.417	-1.396
162	51	-0.985	-0.996	0.000	-0.339	1.533	-0.643	0.548	-1.978
163	51	-0.905	-0.909	0.000	-0.306	1.541	-0.751	0.636	-1.965
163	0	-0.603	-0.707	0.000	-0.306	3.703	-0.153	3.100	-1.165
163	52	-0.905	-0.909	0.000	-0.306	1.600	-0.777	0.695	-1.991

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

innova Precast, S.L.
Ing. Antonio [illegible] Pangrazio
Director de Fiscalización

Barra	Nudo	C.P.	C.P.	S.C.	S.C.	Camión AASHTO	Camión AASHTO	TOTAL	TOTAL
		MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.
164	52	-0.985	-0.996	0.000	-0.339	1.576	-0.610	0.591	-1.945
164	0	-0.658	-0.750	0.000	-0.291	3.052	-0.365	2.394	-1.406
164	53	-0.907	-0.935	0.004	-0.246	0.118	-0.371	-0.785	-1.553
165	53	-1.038	-1.055	0.001	-0.294	0.052	-0.141	-0.984	-1.490
165	0	-0.369	-0.373	0.001	-0.069	0.031	-0.089	-0.337	-0.532
165	54	0.021	0.020	0.008	0.000	0.012	-0.037	0.041	-0.018
166	55	0.023	0.021	0.009	0.000	0.018	-0.041	0.049	-0.020
166	0	-0.367	-0.371	0.001	-0.068	0.045	-0.096	-0.321	-0.536
166	56	-1.034	-1.052	0.002	-0.293	0.051	-0.171	-0.982	-1.515
167	56	-0.898	-0.928	0.004	-0.243	0.122	-0.398	-0.772	-1.569
167	0	-0.671	-0.764	0.000	-0.296	4.041	-0.367	3.370	-1.427
167	57	-1.020	-1.034	0.000	-0.353	1.584	-0.657	0.565	-2.044
168	57	-0.938	-0.945	0.000	-0.319	1.594	-0.770	0.655	-2.034
168	0	-0.636	-0.743	0.000	-0.319	4.790	-0.157	4.154	-1.219
168	58	-0.938	-0.945	0.000	-0.319	1.659	-0.798	0.721	-2.062
169	58	-1.020	-1.034	0.000	-0.353	1.633	-0.628	0.614	-2.014
169	0	-0.671	-0.764	0.000	-0.296	4.015	-0.378	3.344	-1.438
169	59	-0.898	-0.928	0.004	-0.243	0.124	-0.384	-0.770	-1.555
170	59	-1.034	-1.052	0.002	-0.293	0.053	-0.146	-0.980	-1.490
170	0	-0.367	-0.371	0.001	-0.068	0.032	-0.093	-0.334	-0.532
170	60	0.023	0.021	0.009	0.000	0.012	-0.039	0.043	-0.019
171	61	0.023	0.021	0.009	0.000	0.018	-0.041	0.050	-0.020
171	0	-0.366	-0.371	0.001	-0.068	0.046	-0.097	-0.319	-0.536
171	62	-1.033	-1.051	0.002	-0.292	0.055	-0.171	-0.977	-1.515
172	62	-0.896	-0.925	0.004	-0.242	0.124	-0.401	-0.767	-1.568
172	0	-0.676	-0.769	0.000	-0.298	4.231	-0.368	3.555	-1.435
172	63	-1.031	-1.046	0.000	-0.358	1.593	-0.656	0.562	-2.060
173	63	-0.949	-0.957	0.000	-0.324	1.602	-0.770	0.653	-2.051
173	0	-0.647	-0.755	0.000	-0.324	5.094	-0.158	4.447	-1.237
173	64	-0.949	-0.957	0.000	-0.324	1.670	-0.799	0.720	-2.080
174	64	-1.031	-1.046	0.000	-0.358	1.643	-0.628	0.612	-2.032
174	0	-0.676	-0.769	0.000	-0.298	4.204	-0.379	3.529	-1.446
174	65	-0.896	-0.925	0.004	-0.242	0.126	-0.386	-0.766	-1.554
175	65	-1.033	-1.051	0.002	-0.292	0.057	-0.147	-0.975	-1.490
175	0	-0.366	-0.371	0.001	-0.068	0.033	-0.093	-0.332	-0.532
175	66	0.023	0.021	0.009	0.000	0.013	-0.040	0.044	-0.019
176	67	0.023	0.021	0.009	0.000	0.017	-0.041	0.048	-0.020
176	0	-0.367	-0.371	0.001	-0.068	0.045	-0.096	-0.321	-0.536
176	68	-1.034	-1.052	0.002	-0.293	0.053	-0.171	-0.980	-1.515
177	68	-0.898	-0.928	0.004	-0.243	0.123	-0.399	-0.772	-1.570
177	0	-0.671	-0.764	0.000	-0.296	2.324	-0.365	1.652	-1.426
177	69	-1.020	-1.034	0.000	-0.353	1.576	-0.655	0.556	-2.042
178	69	-0.938	-0.945	0.000	-0.319	1.585	-0.769	0.647	-2.033
178	0	-0.636	-0.743	0.000	-0.319	2.962	-0.156	2.327	-1.219
178	70	-0.938	-0.945	0.000	-0.319	1.650	-0.797	0.712	-2.061
179	70	-1.020	-1.034	0.000	-0.353	1.625	-0.626	0.605	-2.012
179	0	-0.671	-0.764	0.000	-0.296	2.298	-0.376	1.627	-1.436
179	71	-0.898	-0.928	0.004	-0.243	0.124	-0.384	-0.770	-1.555
180	71	-1.034	-1.052	0.002	-0.293	0.054	-0.146	-0.979	-1.490
180	0	-0.367	-0.371	0.001	-0.068	0.033	-0.093	-0.334	-0.532
180	72	0.023	0.021	0.009	0.000	0.012	-0.039	0.043	-0.018
181	73	0.021	0.020	0.008	0.000	0.017	-0.039	0.046	-0.020
181	0	-0.369	-0.373	0.001	-0.069	0.044	-0.093	-0.325	-0.535
181	74	-1.038	-1.055	0.001	-0.294	0.052	-0.167	-0.984	-1.516
182	74	-0.907	-0.935	0.004	-0.246	0.117	-0.386	-0.786	-1.567
182	0	-0.658	-0.750	0.000	-0.291	3.285	-0.357	2.627	-1.398
182	75	-0.985	-0.996	0.000	-0.339	1.535	-0.648	0.549	-1.983
183	75	-0.905	-0.909	0.000	-0.306	1.542	-0.755	0.637	-1.969

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

Innova Precast, S.L.
Ing. Antonio M. Pangrazio
Director de Fabricación

Barra	Nudo	C.P.	C.P.	S.C.	S.C.	Camión AASHTO	Camión AASHTO	TOTAL	TOTAL
		MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.
183	0	-0.603	-0.707	0.000	-0.306	4.110	-0.153	3.507	-1.165
183	76	-0.905	-0.909	0.000	-0.306	1.601	-0.781	0.696	-1.995
184	76	-0.985	-0.996	0.000	-0.339	1.578	-0.615	0.592	-1.950
184	0	-0.658	-0.750	0.000	-0.291	3.261	-0.367	2.603	-1.408
184	77	-0.907	-0.935	0.004	-0.246	0.118	-0.372	-0.785	-1.553
185	77	-1.038	-1.055	0.001	-0.294	0.053	-0.141	-0.983	-1.490
185	0	-0.369	-0.373	0.001	-0.069	0.031	-0.090	-0.337	-0.532
185	78	0.021	0.020	0.008	0.000	0.012	-0.038	0.041	-0.018
186	79	0.019	0.018	0.007	0.000	0.015	-0.036	0.041	-0.018
186	0	-0.373	-0.377	0.001	-0.071	0.039	-0.086	-0.333	-0.534
186	80	-1.043	-1.060	0.001	-0.296	0.045	-0.172	-0.997	-1.528
187	80	-0.923	-0.950	0.003	-0.252	0.107	-0.345	-0.812	-1.547
187	0	-0.637	-0.727	0.000	-0.282	3.091	-0.339	2.454	-1.347
187	81	-0.929	-0.934	0.000	-0.315	1.452	-0.625	0.523	-1.875
188	81	-0.849	-0.850	0.000	-0.283	1.457	-0.724	0.608	-1.857
188	0	-0.548	-0.647	0.000	-0.283	3.758	-0.147	3.210	-1.076
188	82	-0.849	-0.850	0.000	-0.283	1.504	-0.746	0.656	-1.879
189	82	-0.929	-0.934	0.000	-0.315	1.485	-0.586	0.556	-1.836
189	0	-0.637	-0.727	0.000	-0.282	3.072	-0.348	2.435	-1.357
189	83	-0.923	-0.950	0.003	-0.252	0.107	-0.347	-0.812	-1.549
190	83	-1.043	-1.060	0.001	-0.296	0.046	-0.132	-0.996	-1.488
190	0	-0.373	-0.377	0.001	-0.071	0.028	-0.083	-0.345	-0.531
190	84	0.019	0.018	0.007	0.000	0.010	-0.034	0.037	-0.017
191	85	0.016	0.014	0.006	0.000	0.012	-0.029	0.034	-0.015
191	0	-0.380	-0.383	0.001	-0.073	0.035	-0.075	-0.345	-0.531
191	86	-1.053	-1.069	0.001	-0.299	0.042	-0.160	-1.010	-1.528
192	86	-0.948	-0.973	0.002	-0.260	0.093	-0.311	-0.853	-1.544
192	0	-0.609	-0.696	0.000	-0.270	2.560	-0.309	1.951	-1.276
192	87	-0.848	-0.850	0.000	-0.282	1.325	-0.588	0.477	-1.720
193	87	-0.766	-0.774	0.000	-0.251	1.327	-0.703	0.561	-1.728
193	0	-0.472	-0.564	0.000	-0.251	3.274	-0.138	2.802	-0.953
193	88	-0.766	-0.774	0.000	-0.251	1.360	-0.691	0.594	-1.716
194	88	-0.848	-0.850	0.000	-0.282	1.345	-0.541	0.497	-1.673
194	0	-0.609	-0.696	0.000	-0.270	2.546	-0.317	1.937	-1.284
194	89	-0.948	-0.973	0.002	-0.260	0.093	-0.306	-0.853	-1.539
195	89	-1.053	-1.069	0.001	-0.299	0.043	-0.116	-1.009	-1.484
195	0	-0.380	-0.383	0.001	-0.073	0.025	-0.072	-0.355	-0.528
195	90	0.016	0.014	0.006	0.000	0.009	-0.028	0.030	-0.014
196	91	0.010	0.009	0.004	0.000	0.008	-0.020	0.021	-0.011
196	0	-0.391	-0.393	0.000	-0.077	0.026	-0.058	-0.364	-0.527
196	92	-1.068	-1.083	0.001	-0.304	0.033	-0.141	-1.034	-1.529
197	92	-0.987	-1.009	0.001	-0.274	0.072	-0.258	-0.914	-1.541
197	0	-0.576	-0.660	0.000	-0.256	2.593	-0.269	2.017	-1.185
197	93	-0.737	-0.748	0.000	-0.240	1.153	-0.535	0.416	-1.523
198	93	-0.660	-0.678	0.000	-0.211	1.151	-0.636	0.491	-1.525
198	0	-0.375	-0.459	0.000	-0.211	2.975	-0.126	2.600	-0.796
198	94	-0.660	-0.678	0.000	-0.211	1.165	-0.611	0.505	-1.499
199	94	-0.737	-0.748	0.000	-0.240	1.155	-0.479	0.419	-1.467
199	0	-0.576	-0.660	0.000	-0.256	2.586	-0.275	2.010	-1.192
199	95	-0.987	-1.009	0.001	-0.274	0.072	-0.243	-0.914	-1.526
200	95	-1.068	-1.083	0.001	-0.304	0.034	-0.092	-1.034	-1.479
200	0	-0.391	-0.393	0.000	-0.077	0.019	-0.056	-0.372	-0.525
200	96	0.010	0.009	0.004	0.000	0.005	-0.019	0.019	-0.010
201	97	0.001	0.000	0.000	-0.000	0.003	-0.007	0.004	-0.007
201	0	-0.408	-0.409	0.000	-0.083	0.013	-0.031	-0.395	-0.522
201	98	-1.094	-1.107	0.000	-0.314	0.017	-0.103	-1.077	-1.523
202	98	-1.048	-1.065	0.000	-0.296	0.040	-0.196	-1.008	-1.557
202	0	-0.541	-0.622	0.000	-0.242	3.084	-0.217	2.544	-1.080

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

innova Precast, S.L.

Ing. Antonio N. Pangrazio
Director de Fiscalización

Barra	Nudo	C.P.	C.P.	S.C.	S.C.	Camión AASHTO	Camión AASHTO	TOTAL	TOTAL
		MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.
202	99	-0.598	-0.621	0.000	-0.187	0.944	-0.478	0.346	-1.286
203	99	-0.534	-0.562	0.000	-0.163	0.945	-0.560	0.411	-1.285
203	0	-0.260	-0.333	0.000	-0.163	3.409	-0.112	3.149	-0.607
203	100	-0.534	-0.562	0.000	-0.163	0.936	-0.519	0.401	-1.244
204	100	-0.598	-0.621	0.000	-0.187	0.926	-0.412	0.327	-1.220
204	0	-0.541	-0.622	0.000	-0.242	3.085	-0.223	2.544	-1.086
204	101	-1.048	-1.065	0.000	-0.296	0.040	-0.152	-1.008	-1.513
205	101	-1.094	-1.107	0.000	-0.314	0.017	-0.053	-1.077	-1.474
205	0	-0.408	-0.409	0.000	-0.083	0.010	-0.030	-0.398	-0.522
205	102	0.001	0.000	0.000	-0.000	0.003	-0.007	0.004	-0.007
206	103	-0.011	-0.012	0.000	-0.004	0.019	-0.010	0.008	-0.026
206	0	-0.436	-0.437	0.000	-0.094	0.031	-0.012	-0.405	-0.543
206	104	-1.140	-1.149	0.000	-0.331	0.042	-0.084	-1.098	-1.564
207	104	-1.145	-1.154	0.000	-0.333	0.066	-0.111	-1.079	-1.598
207	0	-0.507	-0.584	0.000	-0.227	3.451	-0.161	2.945	-0.972
207	105	-0.427	-0.464	0.000	-0.122	0.692	-0.416	0.265	-1.002
208	105	-0.391	-0.431	0.000	-0.108	0.702	-0.468	0.311	-1.007
208	0	-0.128	-0.189	0.000	-0.108	3.797	-0.096	3.669	-0.393
208	106	-0.391	-0.431	0.000	-0.108	0.665	-0.408	0.274	-0.947
209	106	-0.427	-0.464	0.000	-0.122	0.650	-0.342	0.223	-0.928
209	0	-0.507	-0.584	0.000	-0.227	3.459	-0.166	2.952	-0.977
209	107	-1.145	-1.154	0.000	-0.333	0.065	-0.039	-1.080	-1.526
210	107	-1.140	-1.149	0.000	-0.331	0.040	-0.014	-1.100	-1.494
210	0	-0.436	-0.437	0.000	-0.094	0.029	-0.008	-0.406	-0.539
210	108	-0.011	-0.012	0.000	-0.004	0.019	-0.007	0.008	-0.024
211	109	-0.022	-0.023	0.000	-0.009	0.037	-0.018	0.015	-0.050
211	0	-0.479	-0.483	0.000	-0.111	0.103	-0.047	-0.376	-0.642
211	110	-1.221	-1.224	0.000	-0.361	0.168	-0.143	-1.052	-1.728
212	110	-1.301	-1.304	0.000	-0.393	0.308	-0.200	-0.993	-1.897
212	0	-0.478	-0.553	0.000	-0.215	0.915	-0.097	0.437	-0.864
212	111	-0.204	-0.260	0.000	-0.037	0.403	-0.356	0.199	-0.653
213	111	-0.238	-0.290	0.000	-0.050	0.416	-0.333	0.179	-0.674
213	0	0.012	-0.036	0.000	-0.050	1.058	-0.078	1.070	-0.164
213	112	-0.238	-0.290	0.000	-0.050	0.416	-0.289	0.179	-0.629
214	112	-0.204	-0.260	0.000	-0.037	0.403	-0.322	0.199	-0.619
214	0	-0.478	-0.553	0.000	-0.215	0.930	-0.102	0.451	-0.869
214	113	-1.301	-1.304	0.000	-0.393	0.295	-0.092	-1.006	-1.789
215	113	-1.221	-1.224	0.000	-0.361	0.162	-0.053	-1.059	-1.639
215	0	-0.479	-0.483	0.000	-0.111	0.099	-0.033	-0.380	-0.628
215	114	-0.022	-0.023	0.000	-0.009	0.036	-0.013	0.014	-0.045
216	115	-0.023	-0.025	0.000	-0.009	0.042	-0.019	0.019	-0.053
216	0	-0.535	-0.544	0.000	-0.134	0.201	-0.097	-0.333	-0.774
216	116	-1.335	-1.340	0.000	-0.405	0.361	-0.241	-0.974	-1.986
217	116	-1.551	-1.576	0.000	-0.495	0.771	-0.409	-0.780	-2.481
217	0	-0.458	-0.530	0.000	-0.206	0.851	-0.044	0.394	-0.779
217	117	0.113	0.031	0.106	-0.023	0.251	-0.414	0.470	-0.405
218	117	-0.093	-0.158	0.031	-0.026	0.192	-0.257	0.129	-0.442
218	0	0.144	0.108	0.005	0.000	0.856	-0.085	1.005	0.023
218	118	-0.093	-0.158	0.031	-0.026	0.189	-0.237	0.127	-0.421
219	118	0.113	0.031	0.106	-0.023	0.251	-0.436	0.470	-0.428
219	0	-0.458	-0.530	0.000	-0.206	0.872	-0.044	0.415	-0.780
219	119	-1.551	-1.576	0.000	-0.495	0.740	-0.237	-0.811	-2.309
220	119	-1.335	-1.340	0.000	-0.405	0.347	-0.124	-0.988	-1.869
220	0	-0.535	-0.544	0.000	-0.134	0.194	-0.069	-0.341	-0.746
220	120	-0.023	-0.025	0.000	-0.009	0.040	-0.014	0.017	-0.048
221	121	-0.072	-0.081	0.000	-0.033	0.164	-0.057	0.092	-0.171
221	0	-0.568	-0.578	0.000	-0.146	0.254	-0.132	-0.314	-0.856
221	122	-1.352	-1.353	0.000	-0.407	0.344	-0.277	-1.008	-2.037

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

innova Precast S.A.
Ing. Antonio N. Pargario
Director de Fiscalizacion

Barra	Nudo	C.P.	C.P.	S.C.	S.C.	Camión AASHTO	Camión AASHTO	TOTAL	TOTAL
		MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.
222	122	-2.015	-2.081	0.000	-0.687	1.684	-0.846	-0.331	-3.613
222	0	-0.445	-0.516	0.000	-0.201	6.248	-0.040	5.802	-0.757
222	123	0.645	0.519	0.298	-0.012	0.565	-1.324	1.508	-0.817
223	123	-0.005	-0.078	0.039	-0.000	0.613	-0.856	0.647	-0.934
223	0	0.225	0.196	0.038	0.000	6.282	-0.083	6.545	0.114
223	124	-0.005	-0.078	0.039	-0.000	0.614	-0.742	0.647	-0.820
224	124	0.645	0.519	0.298	-0.012	0.493	-1.224	1.436	-0.717
224	0	-0.445	-0.516	0.000	-0.201	6.273	-0.040	5.828	-0.757
224	125	-2.015	-2.081	0.000	-0.687	1.625	-0.553	-0.390	-3.320
225	125	-1.352	-1.353	0.000	-0.407	0.333	-0.160	-1.019	-1.920
225	0	-0.568	-0.578	0.000	-0.146	0.245	-0.096	-0.323	-0.821
225	126	-0.072	-0.081	0.000	-0.033	0.158	-0.040	0.086	-0.154

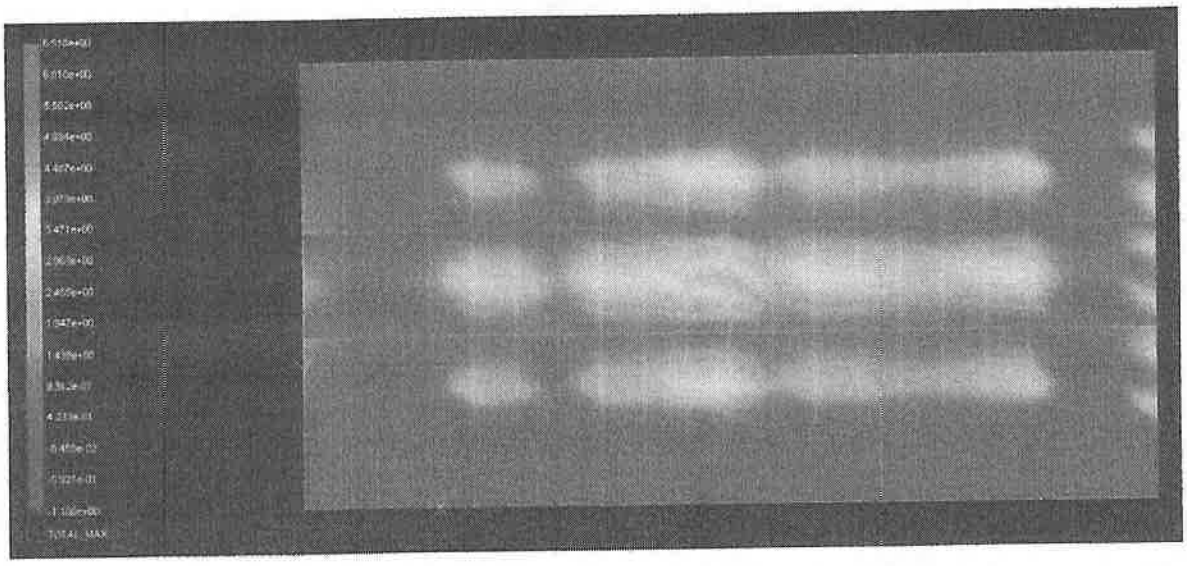
Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

Ing. Antonio [illegible] Pangrazio
Director de Fiscalización

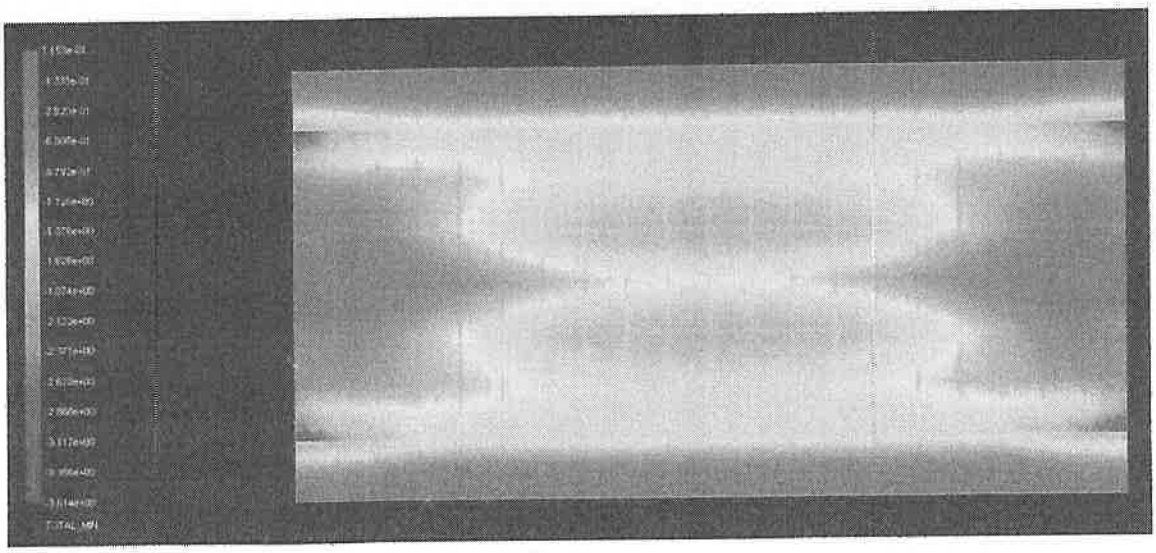
9.2. Cálculo de losa

Se adjuntan las envolventes de momentos flectores

ENVOLVENTE ESFUERZOS POSITIVOS LOSA ELS



ENVOLVENTE ESFUERZOS NEGATIVOS LOSA ELS



Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

Ing. Antonio N. Pangrazio
Dirección de Fiscalización
innova Precast, S.L.

Se calcula a continuación el armado necesario

F'c losa =25 MPa

Canto de losa 22cm

Armadura de losa dispuesta

Capa	Armadura dispuesta (cm^2)		Cota (cm)
1	Φ12 a 15cm	7,54	18
2	Φ8 a 15cm	3,35	9
3	Φ16 a 12,3cm	16,35	4

[kNm]

ARMADURA INFERIOR

$M_u^+ = 79,8$ kNm

Φ =0,90

Cota	Área [cm^2]	Def. (0/00)	Tensión [MPa]
0,18	7,54	0,8	159
0,04	16,35	-8,7	-420

$M_R^+ = 117,9$ kNm

$D = \frac{|M_u|}{C} = \frac{77,98}{\phi M_R} = \frac{77,98}{0,90 \times 119,1} = 0,73$, la sección satisface el esfuerzo flector solicitante

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

Ing. Antonio M. Pangrazio
Director de Fiscalización

ARMADURA SUPERIOR

$M_u^- = -35,5$ kNm

Canto de losa 20cm

$\Phi = 0,90$

Cota	Área (cm^2)	Def. (0/00)	Tensión
0,16	7,54	-10,0	-420
0,04	6,0	-0,6	-118

$M_R^- = 50$ kNm

$\frac{D}{C} = \frac{|M_u|}{\emptyset M_R} = \frac{35,5}{0,90 \times 50} = 0,79$, la sección satisface el esfuerzo flector solicitante

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

Ing. Antonio N. Pangrazio
Director de Fiscalización

9.3. Cálculo de viga

Se calcula la viga que tiene máximos esfuerzos, la viga lateral).

CARACTERISTICAS MECANICAS

[INICIALES]		[SEMIFINALES]		[FINALES]	
Val [m] =	0,61041	VaSF [m] =	0,2140	VaF [m] =	0,2140
Vbl [m] =	0,58959	VbSF [m] =	0,9860	VbF [m] =	0,9860
Area [m²] =	0,34134	VcSF [m] =	0,4140	VcF [m] =	0,4140
Inercia [m⁴] =	0,07093	I. Semifinal [m⁴] =	0,1685	Inercia final [m⁴]=	0,1685
		A. Semifinal [m²] =	0,7930	AREA [m2]=	0,7930

TENSIONES DE FLEXION DEBIDO A LAS CARGAS EXTERIORES SIN PRETENSADO [Tn/m2]

Mpp viga	39,37	Mpp losa I	0,00	M pavimento + Maceras	22,67	M sc	64,64
Mpp losa I	60,84				46,75	M vehiculo pesado	103,10

	EN FABRICA		PESO LOSA I (Sec. Inicial)		PESO LOSA II (Sec. Final)			CON CARGAS PERMANENTES		
PUNTO	SA	SB	SA	SB	SA	SB	SC	SA	SB	SC
9,68	343,97	-332,24	523,57	-505,71	0,00	0,00	0,00	955,72	-1244,19	170,58
9,00	342,27	-330,60	520,98	-503,21	0,00	0,00	0,00	951,00	-1238,04	169,74
8,50	338,85	-327,29	515,78	-498,19	0,00	0,00	0,00	941,50	-1225,68	168,04
8,00	333,60	-322,22	507,78	-490,46	0,00	0,00	0,00	926,90	-1206,67	165,44
7,50	326,51	-315,37	496,99	-480,04	0,00	0,00	0,00	907,20	-1181,02	161,92
7,00	317,58	-306,74	483,40	-466,91	0,00	0,00	0,00	882,39	-1148,72	157,49
6,50	306,81	-296,34	467,01	-451,08	0,00	0,00	0,00	852,47	-1109,77	152,15
6,00	294,21	-284,17	447,82	-432,55	0,00	0,00	0,00	817,45	-1064,18	145,90
5,50	279,76	-270,22	425,84	-411,32	0,00	0,00	0,00	777,32	-1011,95	138,74
5,00	263,49	-254,50	401,06	-387,38	0,00	0,00	0,00	732,09	-953,06	130,67
4,50	245,37	-237,00	373,49	-360,75	0,00	0,00	0,00	681,76	-887,54	121,68
4,00	225,42	-217,73	343,12	-331,41	0,00	0,00	0,00	626,32	-815,36	111,79
3,50	203,63	-196,68	309,95	-299,37	0,00	0,00	0,00	565,77	-736,54	100,98
3,00	180,00	-173,86	273,98	-264,64	0,00	0,00	0,00	500,12	-651,07	89,26
2,50	154,53	-149,26	235,22	-227,20	0,00	0,00	0,00	429,37	-558,96	76,63
2,00	127,23	-122,89	193,66	-187,05	0,00	0,00	0,00	353,50	-460,20	63,09
1,50	98,09	-94,74	149,31	-144,21	0,00	0,00	0,00	272,54	-354,80	48,64
1,00	67,11	-64,82	102,15	-98,67	0,00	0,00	0,00	186,47	-242,75	33,28
0,50	34,30	-33,13	52,20	-50,42	0,00	0,00	0,00	95,29	-124,06	17,01
0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

ES DE FLEXION DEBIDO A LAS CARGAS EXTERIORES SIN PRETENSADO

SERVICIO I

$Y_{o\ vehículo\ pesado}$ = 1,00
$Y_{o\ sc\ uniforme}$ = 1,00
$Y_{o\ temperatura}$ = 1,00

SERVICIO III

$Y_{1\ vehículo\ pesado}$ = 0,80
$Y_{1\ sc\ uniforme}$ = 0,80
$Y_{1\ temperatura}$ = 1,00

	SERVICIO I AASHTO LRFD 2012			SERVICIO III AASHTO LRFD 2012			
PUNTO	SA	SB	SC	SA	SB	SC	PUNTO
9,68	1152,27	-2149,71	556,81	1112,96	-1968,60	474,76	9,68
9,00	1146,58	-2139,09	548,09	1107,46	-1958,88	472,42	9,00
8,50	1135,13	-2117,73	542,62	1096,40	-1939,32	467,70	8,50
8,00	1117,53	-2084,89	534,20	1079,40	-1909,24	460,45	8,00
7,50	1093,77	-2040,56	522,84	1056,45	-1868,66	450,66	7,50
7,00	1063,85	-1984,76	508,55	1027,56	-1817,55	438,33	7,00
6,50	1027,79	-1917,47	491,30	992,72	-1755,93	423,47	6,50
6,00	985,56	-1838,70	471,12	951,94	-1683,79	406,08	6,00
5,50	937,19	-1748,44	448,00	905,21	-1601,14	386,14	5,50
5,00	882,66	-1646,71	421,93	852,54	-1507,98	363,68	5,00
4,50	821,97	-1533,48	392,92	793,92	-1404,29	338,67	4,50
4,00	755,12	-1408,78	360,97	729,36	-1290,10	311,13	4,00
3,50	682,13	-1272,60	326,07	658,86	-1165,38	281,05	3,50
3,00	602,97	-1124,93	288,23	582,40	-1030,16	248,44	3,00
2,50	517,67	-965,78	247,46	500,01	-884,41	213,29	2,50
2,00	426,21	-795,14	203,74	411,67	-728,15	175,61	2,00
1,50	328,59	-613,02	157,07	317,38	-561,38	135,39	1,50
1,00	224,82	-419,43	107,47	217,15	-384,09	92,63	1,00
0,50	114,89	-214,34	54,92	110,97	-196,29	47,34	0,50
0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

SA: fibra superior de viga
SB: fibra inferior de viga
SC: fibra superior de losa

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

Ing. Antonio M. Pangrazio
Director de Fiscalización

CUADRO DE PRETENSADOS

	CABLES PRETENSADOS				
CABLE	0,5	0,5	0,5	0,5	0,5
COTA	5	9	13	17	116
AREA (mm2)	98	98	98	98	98
PUNTO					
9,68	13	12	0	0	2
9,00	13	12	0	0	2
8,50	13	12	0	0	2
8,00	13	12	0	0	2
7,50	13	12	0	0	2
7,00	13	12	0	0	2
6,50	13	12	0	0	2
6,00	13	12	0	0	2
5,50	13	12	0	0	2
5,00	13	12	0	0	2
4,50	13	12	0	0	2
4,00	13	12	0	0	2
3,50	13	12	0	0	2
3,00	13	12	0	0	2
2,50	13	12	0	0	2
2,00	13	10	0	0	2
1,50	13	10	0	0	2
1,00	13	8	0	0	2
0,50	13	8	0	0	2
0,00	13	8	0	0	2

CALCULO A ROTURA

Hormigón

$f'_{c\ losa}$ = 25 N/mm²

β_1 = 0,85 LRFD sec 5.6.2.2

β_1 = 0,85 LRFD sec 5.6.2.2

Acero

f_{pu} = 1860 N/mm²

f_{py} = 1674 N/mm²

k= 0,280 Prestressing factor

f_s = 413,7 N/mm²

$b_{ancho\ losa}$ = 2,60 m

h_{losa} = 0,20 m

h_{viga} = 1,20 m

ϕ_f = 1

ϕ_c = 1

ϕ_v = 0,9

PUNTO	A_{ps} [mm]	Cota tracciones [mm]	d_p [mm]	A_s [mm]	ds [mm]	b [mm]	c [mm]	a < h_{losa} [mm]		f_{ps} [N/mm²]	M_r [Txm]	M_u [Txm]	$M_r > M_u$	Arm. Long. necesaria
9,675	2450,0	69,20	1330,80	0	0,00	2600	95,09	80,83	ok	1822,8	576,3	489,3	ok	ok
9,00	2450,0	69,20	1330,80	0	0,00	2600	95,09	80,83	ok	1822,8	576,3	486,8	ok	ok
8,50	2450,0	69,20	1330,80	0	0,00	2600	95,09	80,83	ok	1822,8	576,3	482,0	ok	ok
8,00	2450,0	69,20	1330,80	0	0,00	2600	95,09	80,83	ok	1822,8	576,3	474,5	ok	ok
7,50	2450,0	69,20	1330,80	0	0,00	2600	95,09	80,83	ok	1822,8	576,3	464,4	ok	ok
7,00	2450,0	69,20	1330,80	0	0,00	2600	95,09	80,83	ok	1822,8	576,3	451,7	ok	ok
6,50	2450,0	69,20	1330,80	0	0,00	2600	95,09	80,83	ok	1822,8	576,3	436,4	ok	ok
6,00	2450,0	69,20	1330,80	0	0,00	2600	95,09	80,83	ok	1822,8	576,3	418,5	ok	ok
5,50	2450,0	69,20	1330,80	0	0,00	2600	95,09	80,83	ok	1822,8	576,3	397,9	ok	ok
5,00	2450,0	69,20	1330,80	0	0,00	2600	95,09	80,83	ok	1822,8	576,3	374,8	ok	ok
4,50	2450,0	69,20	1330,80	0	0,00	2600	95,09	80,83	ok	1822,8	576,3	349,0	ok	ok
4,00	2450,0	69,20	1330,80	0	0,00	2600	95,09	80,83	ok	1822,8	576,3	320,6	ok	ok
3,50	2450,0	69,20	1330,80	0	0,00	2600	95,09	80,83	ok	1822,8	576,3	289,6	ok	ok
3,00	2450,0	69,20	1330,80	0	0,00	2600	95,09	80,83	ok	1822,8	576,3	256,0	ok	ok
2,50	2450,0	69,20	1330,80	0	0,00	2600	95,09	80,83	ok	1822,8	576,3	219,8	ok	ok
2,00	2254,0	67,39	1332,61	0	0,00	2600	87,63	74,48	ok	1825,8	533,1	181,0	ok	ok
1,50	2254,0	67,39	1332,61	0	0,00	2600	87,63	74,48	ok	1825,8	533,1	139,5	ok	ok
1,00	2058,0	65,24	1334,76	0	0,00	2600	80,14	68,12	ok	1828,7	489,5	95,5	ok	ok
0,50	2058,0	65,24	1334,76	226,19	1330	2600	82,10	69,78	ok	1828,0	501,1	48,8	ok	ok
0,00	2058,0	65,24	1334,76	226,19	1330	2600	82,10	69,78	ok	1828,0	501,1	0,0	ok	ok

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

Ing. Antonio N. Pangrazio
Director de Fiscalización

TENSIONES EN DIFERENTES PUNTOS A LO LARGO DE LA VIGA [Tn/m2]

Desfavorable γ_p = 1 Pretensado

FABRICA = Peso Propio + Pretensado con Pérdidas a Corto Plazo

Favorable γ_p = 1 Pretensado CON CARGAS PERMANENTES = Cargas Permanentes + Pretensado con Pérdidas Totales

	AL DESTESAR		EN FABRICA		CON CARGAS PERMANENTES			SERVICIO I AASHTO LRFD 2012			SERVICIO III AASHTO LRFD 2012		
PUNTO	SA	SB	SA	SB	SA	SB	SC	SA	SB	SC	SA	SB	SC
9,68	38,30	2026,01	38,3	2026,0	698,3	741,7	170,6	894,9	-163,8	550,8	855,6	17,3	474,8
9,00	36,60	2027,65	36,6	2027,6	693,6	747,8	169,7	889,2	-153,2	548,1	850,1	27,0	472,4
8,50	33,18	2030,95	33,2	2030,9	684,1	760,2	168,0	877,7	-131,8	542,6	839,0	46,6	467,7
8,00	27,93	2036,02	27,9	2036,0	669,5	779,2	165,4	860,1	-99,0	534,2	822,0	76,6	460,4
7,50	20,83	2042,87	20,8	2042,9	649,8	804,9	161,9	836,4	-54,7	522,8	799,0	117,2	450,7
7,00	11,91	2051,50	11,9	2051,5	625,0	837,2	157,5	806,4	1,1	508,5	770,2	168,3	438,3
6,50	1,14	2061,90	1,1	2061,9	595,1	876,1	152,2	770,4	68,4	491,3	735,3	230,0	423,5
6,00	-11,47	2074,07	-11,5	2074,1	560,0	921,7	145,9	728,2	147,2	471,1	694,5	302,1	406,1
5,50	-25,91	2088,02	-25,9	2088,0	519,9	973,9	138,7	679,8	237,4	448,0	647,8	384,7	386,1
5,00	-42,19	2103,74	-42,2	2103,7	474,7	1032,8	130,7	625,2	339,2	421,9	595,1	477,9	363,7
4,50	-60,30	2121,24	-60,3	2121,2	424,4	1098,4	121,7	564,6	452,4	392,9	536,5	581,6	338,7
4,00	-80,26	2140,52	-80,3	2140,5	368,9	1170,5	111,8	497,7	577,1	361,0	472,0	695,8	311,1
3,50	-102,05	2161,56	-102,0	2161,6	308,4	1249,3	101,0	424,7	713,3	326,1	401,4	820,5	281,1
3,00	-125,67	2184,39	-125,7	2184,4	242,7	1334,8	89,3	345,6	861,0	288,2	325,0	955,7	248,4
2,50	-151,14	2208,98	-151,1	2209,0	172,0	1426,9	76,6	260,3	1020,1	247,5	242,6	1101,5	213,3
2,00	-142,10	2047,44	-142,1	2047,4	126,7	1367,4	63,1	199,4	1032,5	203,7	184,9	1099,5	175,6
1,50	-171,24	2075,58	-171,2	2075,6	45,7	1472,8	48,6	101,8	1214,6	157,1	90,6	1266,3	135,4
1,00	-165,88	1917,59	-165,9	1917,6	-9,7	1426,6	33,3	28,6	1250,0	107,5	20,9	1285,3	92,6
0,50	-198,69	1949,28	-198,7	1949,3	-100,9	1545,3	17,0	-81,3	1455,1	54,9	-85,2	1473,1	47,3
0,00	-232,99	1982,41	-233,0	1982,4	-196,2	1669,4	0,0	-196,2	1669,4	0,0	-196,2	1669,4	0,0
MAX	38,30	2208,98	38,30	2208,98	698,31	1669,40	170,58	894,86	1669,40	550,81	855,55	1669,40	474,76
MIN	-232,99	1917,59	-232,99	1917,59	-196,20	741,70	0,00	-196,20	-163,82	0,00	-196,20	17,29	0,00

RESISTENCIA AL DESTESAR (Mpa)
38,50

HORMIGÓN VIGA (Mpa)
50,00

Compressive Stress limit before losses (0.60f'ci)	21,90 MPa
Máx Calculated Compression Stress	21,65 MPa
	ok
Tensile Stress limit before losses (0.63RAIZ(f'ci))	3,81 MPa
Máx Calculated Tension Stress	2,28 MPa
	ok
Stresses at Service Limit State After Loses	
Compressive Stress limit due to the sum of effective prestress and permanet loads (0.45f'c)	22,50 MPa
Máx Calculated Compression Stress	16,36 MPa
	ok
Compressive Stress limit due to live load and one-half the sum of effective prestress and permanet loads (0.40f'c)	20,00 MPa
Máx Calculated Compression Stress	8,18 MPa
	ok
Compressive Stress limit due to the sum of effective prestress, permanet loads and transient loads (0.60f'c)	30,00 MPa
Máx Calculated Compression Stress	16,36 MPa
	ok
Tensile Stress Stress limit in Load Combination Service III (0.50RAIZ(f'c))	-3,54 MPa
Máx Calculated Tension Stress	0,17 MPa
	ok

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

Ing. Antonio N. Pangrazio
Director de Fiscalización

CALCULO A CORTANTE AASHTO LRFD

Viga	8,26
Losa	12,58
Acera, barrera	10,82
Aglomerado	4,22
TOTAL CM (T)	31,66

SC*	9,95
CARRO	19,34
TOTAL SC (T)	29,29

Hormigón
f'c viga= 50 N/mm2
bv = 125 mm
Ec= 33941 N/mm²

Acero
f_{po}= 1860 N/mm²
f_s= 413,7 N/mm²
Es= 207000 N/mm²
Ep= 197000 N/mm²
β_v= 0,9

PUNTO	Vu [T]	Vp [T]	Mu [Tm]	N_u [T]	Vu [N]	Vp [N]	Mu [Nmm]	Nu TOTAL [N]	b_w [mm]	d_p [mm]	d_o [mm]	dv [mm]	ConcRatio < 1		A_{ps} mm²	A_s mm²	A_{ct} mm²
9,68	20,00	0,00	489,25	0	201849	0,0	4794650000	0	125	1331	1330,8	1290,4	0,111	ok	2450	0,0	223800,0
9,00	25,88	0,00	486,83	0	254587	0,0	4770965033	0	125	1331	1330,8	1290,4	0,140	ok	2450	0,0	223800,0
8,50	29,94	0,00	481,97	0	293364	0,0	4723328745	0	125	1331	1330,8	1290,4	0,162	ok	2450	0,0	223800,0
8,00	33,89	0,00	474,50	0	332142	0,0	4650081550	0	125	1331	1330,8	1290,4	0,183	ok	2450	0,0	223800,0
7,50	37,85	0,00	464,41	0	370919	0,0	4551223447	0	125	1331	1330,8	1290,4	0,204	ok	2450	0,0	223800,0
7,00	41,81	0,00	451,71	0	409696	0,0	4426754436	0	125	1331	1330,8	1290,4	0,226	ok	2450	0,0	223800,0
6,50	45,76	0,00	436,40	0	448474	0,0	4276674519	0	125	1331	1330,8	1290,4	0,247	ok	2450	0,0	223801,0
6,00	49,72	0,00	418,47	0	487251	0,0	4100983694	0	125	1331	1330,8	1290,4	0,269	ok	2450	0,0	223802,0
5,50	53,68	0,00	397,93	0	526029	0,0	3899681961	0	125	1331	1330,8	1290,4	0,290	ok	2450	0,0	223803,0
5,00	57,63	0,00	374,77	0	564806	0,0	3672769321	0	125	1331	1330,8	1290,4	0,311	ok	2450	0,0	223804,0
4,50	61,59	0,00	349,00	0	603583	0,0	3420245773	0	125	1331	1330,8	1290,4	0,333	ok	2450	0,0	223805,0
4,00	65,55	0,00	320,62	0	642361	0,0	3142111318	0	125	1331	1330,8	1290,4	0,354	ok	2450	0,0	223806,0
3,50	69,50	0,00	289,63	0	681139	0,0	2838365956	0	125	1331	1330,8	1290,4	0,375	ok	2450	0,0	223800,0
3,00	73,46	0,00	256,02	0	719916	0,0	2509009686	0	125	1331	1330,8	1290,4	0,397	ok	2450	0,0	223800,0
2,50	77,42	0,00	219,80	0	758693	0,0	2154042508	0	125	1331	1330,8	1290,4	0,418	ok	2450	0,0	223800,0
2,00	81,37	0,00	180,97	0	797471	0,0	1773464423	0	125	1333	1332,6	1295,4	0,438	ok	2254	0,0	223801,0
1,50	85,33	0,00	139,52	0	836248	0,0	1367275431	0	125	1333	1332,6	1295,4	0,459	ok	2254	0,0	223802,0
1,00	89,29	0,00	95,46	0	875026	0,0	935476531	0	125	1335	1334,8	1300,7	0,478	ok	2058	0,0	223800,0
0,50	93,25	0,00	48,78	0	913803	0,0	478064724	0	125	1335	1334,6	1299,8	0,500	ok	2058	226,2	223800,0
0,00	97,16	0,00	0,00	0	952193	0,0	0	0	125	1335	1334,6	1299,8	0,521	ok	0	226,2	223800,0

PUNTO	ε_{sinit} < 0,006		A_c^*	N_u/A_c' < 0,52*50^1/2		θ	β	Vc [N]	Asmin/s [mm]	As nec/s [mm]	As dispuesta/s [mm]	Vs [N]	Vn [N]	D/C < 1	
9,68	0,0015	ok	0,793	0,000	3,677	2,25	34,27	213264	0,177	0,014	0,67	52494	738210	0,30	ok
9,00	0,0016	ok	0,793	0,000	3,677	2,20	34,52	208047	0,177	0,09	0,67	520065	728113	0,38	ok
8,50	0,0016	ok	0,793	0,000	3,677	2,19	34,59	207772	0,177	0,152	0,67	519805	727577	0,44	ok
8,00	0,0015	ok	0,793	0,000	3,677	2,22	34,40	210462	0,177	0,203	0,67	522348	732810	0,50	ok
7,50	0,0015	ok	0,793	0,000	3,677	2,29	34,13	216353	0,177	0,249	0,67	527751	744104	0,55	ok
7,00	0,0013	ok	0,793	0,000	3,677	2,39	33,71	225998	0,177	0,287	0,67	536137	762135	0,59	ok
6,50	0,0012	ok	0,793	0,000	3,677	2,54	33,15	240402	0,177	0,316	0,67	547701	788104	0,63	ok
6,00	0,0010	ok	0,793	0,000	3,677	2,76	32,44	261323	0,177	0,334	0,67	562725	824051	0,65	ok
5,50	0,0007	ok	0,793	0,000	3,677	3,08	31,59	291902	0,177	0,337	1,04	907876	1200666	0,48	ok
5,00	0,0005	ok	0,793	0,000	3,677	3,57	30,60	338174	0,177	0,321	1,04	945122	1283296	0,48	ok
4,50	0,0001	ok	0,793	0,000	3,677	4,36	29,46	413150	0,177	0,272	1,04	989453	1402603	0,47	ok
4,00	0,0000	ok	0,793	0,000	3,677	4,85	28,95	459192	0,177	0,264	1,04	1010540	1469732	0,48	ok
3,50	0,0000	ok	0,793	0,000	3,677	4,94	28,86	467821	0,177	0,298	1,04	1014096	1481918	0,51	ok
3,00	-0,0001	ok	0,793	0,000	3,677	5,05	28,77	477705	0,177	0,331	1,04	1018034	1495739	0,53	ok
2,50	-0,0001	ok	0,793	0,000	3,677	5,17	28,67	488982	0,177	0,362	2,09	2044719	2016223	0,41	ok
2,00	-0,0001	ok	0,793	0,000	3,677	5,17	28,66	491358	0,177	0,403	2,09	2052975	2024010	0,43	ok
1,50	-0,0001	ok	0,793	0,000	3,677	5,32	28,54	505310	0,177	0,430	2,09	2063201	2024010	0,45	ok
1,00	-0,0001	ok	0,793	0,000	3,677	5,34	28,52	509899	0,177	0,467	2,09	2079486	2032342	0,47	ok
0,50	-0,0002	ok	0,793	0,000	3,677	5,52	28,39	526247	0,177	0,492	2,09	2083503	2030867	0,50	ok
0,00	-0,0002	ok	0,793	0,000	3,677	5,78	28,20	551110	0,177	0,506	2,09	2099516	2030867	0,52	ok

Comprobación de deformaciones

FLECHAS (mm) EN CENTRO DE VANO (0.5 x L = 9,68 m)

SERVICE I

	Fábrica	Mult.	Montaje	Mult.	Final
pretensado	28,20	1,80	50,76	2,20	62,04
peso propio	-16,70	1,85	-30,90	2,40	-40,08
Losa			-11,20	2,30	-25,76
Riostra			0,00	3,00	0,00
C.Permanentes					-2,90
Live Load					-4,30
Total	11,50		8,67		-11,00

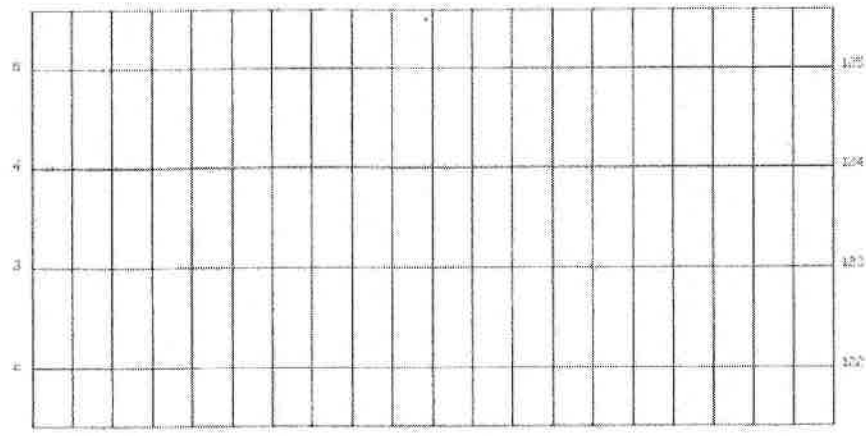
Valores positivos indican contraflecha

La deflexion causada por carga viva (considerando coeficiente de impacto) es 11 mm. Se comprueba que es inferior a 19350 mm / 800 = 24,2 mm.

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

Innova Precast S.L.
Ing. Antonio M. Pangrazio
Director de Fiscalización

9.4. Reacciones en apoyos



Envolvente de reacciones verticales

Nudo	Peso Propio	Peso Propio	C.P.	C.P.	S.C.	S.C.	Camión AASHTO	Camión AASHTO	Carril	Carril	TOTAL	TOTAL
	Viga	Losa	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.
2	8.263	12.578	18.287	16.170	4.224	-0.172	19.141	-1.368	6.497	-0.399	68.990	35.072
3	8.263	11.610	7.642	4.341	0.000	-0.569	25.224	0.000	9.416	0.000	62.155	23.646
4	8.263	11.610	7.642	4.341	0.000	-0.569	25.224	0.000	9.632	0.000	62.371	23.646
5	8.263	12.578	18.287	16.170	4.224	-0.172	19.141	-1.368	4.600	-0.458	67.093	35.013
122	8.263	12.578	18.287	16.170	4.224	-0.172	22.593	-1.384	6.497	-0.399	72.442	35.055
123	8.263	11.610	7.642	4.341	0.000	-0.569	33.699	0.000	9.416	0.000	70.631	23.646
124	8.263	11.610	7.642	4.341	0.000	-0.569	33.699	0.000	9.632	0.000	70.847	23.646
125	8.263	12.578	18.287	16.170	4.224	-0.172	22.593	-1.384	4.600	-0.458	70.545	34.997

Ing. Antonio N. Pangrazio
Director de Fiscalización

REACCIONES HORIZONTALES

REACCIONES HORIZONTALES DEBIDAS A RETRACCION Y FLUENCIA

- Propiedades de los materiales (t/m2)

E pila : 2,00E+06
G neopreno : 100,00

APOYO	SUBESTRUCTURA		NEOPRENOS		CONSTANTES ELÁSTICAS (t/m)			DESPLAZAMIENTOS Y REACCIONES			
	Altura (m)	Inercia (m4)	Area (m2)	Altura (m)	Pila	Neoprenos	Total	x (m)	K.Dx (t)	Desplaz. (m)	Reacción (t)
Estribo 1	0,000	0,000	0,250	0,032	0,000	675,676	675,676	0,000	0,000	0,00637	4,304
Estribo 2	0,000	0,000	0,250	0,032	0,000	675,676	675,676	19,600	13243,243	-0,00637	-4,304

REACCIONES HORIZONTALES DEBIDAS A FRENADO

- Propiedades de los materiales (t/m2)

E pila : 3,00E+06
G neopreno : 180
Frenado (t) 27,556

APOYOS	Subestructura		NEOPRENOS		CONSTANTES ELÁSTICAS			FRENADO	
	Altura (m)	Inercia (m4)	Area (m2)	Altura (m)	Pila	Neoprenos	Total	Ki / K1	Hfr (t)
Estribo 1	0,000	0,000	0,250	0,032	0,000	1216,216	1216,216	1,000	13,778
Estribo 2	0,000	0,000	0,250	0,032	0,000	1216,216	1216,216	1,000	13,778
							Total...	*2,000*	*27,556*

REACCIONES HORIZONTALES DEBIDAS A VIENTO

- Propiedades de los materiales (t/m2)

E pila : 3,00E+06
G neopreno : 180
Viento (t) 14,536

APOYOS	Subestructura		NEOPRENOS		CONSTANTES ELÁSTICAS			VIENTO	
	Altura (m)	Inercia (m4)	Area (m2)	Altura (m)	Pila	Neoprenos	Total	Ki / K1	Hfr (t)
Estribo 1	0,000	0,000	0,250	0,032	0,000	1216,216	1216,216	1,000	7,268
Estribo 2	0,000	0,000	0,250	0,032	0,000	1216,216	1216,216	1,000	7,268
							Total...	*2,000*	*14,536*

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

Ing. Antonio N. Pangrazio
Director de Fiscalizacion

9.5. Cálculo de neoprenos

innova Precast, S.L.

SITUACION NO SISMICA

REACCIONES

	ESTRIBO 1 VANO 1				ESTRIBO 2 VANO 1			
	Apoyo 1	Apoyo 2	Apoyo 3	Apoyo 4	Apoyo 5	Apoyo 6	Apoyo 7	Apoyo 8
P.P. VIGA (T)	8.29	8.29	8.29	8.29	8.29	8.29	8.29	8.29
LOSA (T)	12.61	11.64	11.64	12.61	12.61	11.64	11.64	12.61
PAV. + BARRERA (T)	10.32	7.68	7.68	10.32	10.32	7.68	7.68	10.32
RIOSTRA (T)	1.39	1.89	1.89	1.39	1.39	1.89	1.89	1.39
SOBRECARGA MAX (T)	10.75	9.43	9.43	10.75	10.75	9.43	9.43	10.75
SOBRECARGA MIN (T)	-0.64	-0.57	-0.57	-0.64	-0.64	-0.57	-0.57	-0.64
CARRO MAX (T)	22.60	33.71	33.71	22.60	22.60	33.71	33.71	22.60
CARRO MIN (T)	-1.39	0.00	0.00	-1.39	-1.39	0.00	0.00	-1.39
MAX (T)	73.91	72.63	72.63	73.91	73.91	72.63	72.63	73.91
MIN (T)	38.54	28.93	28.93	38.54	38.54	28.93	28.93	38.54

NEOPRENOS

a <= b

a (mm)	250	250	250	250	250	250	250	250
b (mm)	250	250	250	250	250	250	250	250
Compresión máx σ_{max} (Kg/cm²)	118.208	116.208	116.208	118.208	118.208	116.208	116.208	118.208
Compresión mín σ_{min} (Kg/cm²)	61.603	46.280	46.280	61.603	61.603	46.280	46.280	61.603
área (m²)	0.063	0.063	0.063	0.063	0.063	0.063	0.063	0.063

NEOPRENOS

	ESTRIBO 1				ESTRIBO 2			
	Apoyo 1	Apoyo 2	Apoyo 3	Apoyo 4	Apoyo 5	Apoyo 6	Apoyo 7	Apoyo 8
Neopreno (mm)	8	8	8	8	8	8	8	8
Acero (mm)	3	3	3	3	3	3	3	3
Nº de capas de neopreno	4	4	4	4	4	4	4	4
h neopreno (m)	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.032
h total (mm)	52	52	52	52	52	52	52	52
a (mm)	245	245	245	245	245	245	245	245
b' (mm)	245	245	245	245	245	245	245	245
A (mm²)	60025	60025	60025	60025	60025	60025	60025	60025
A (mm²)	54225	54225	54225	54225	54225	54225	54225	54225
L_r (mm)	980	980	980	980	980	980	980	980
Te (mm)	37	37	37	37	37	37	37	37
Factor de forma, S	7.656	7.656	7.656	7.656	7.656	7.656	7.656	7.656

Módulo de cizalle G_d (T/m²)	100
Módulo de deformación transversal neopreno cargas rápidas (T/m²)	180
f_y (t/m²)	235
Es (T/m²)	2000000

	ESTRIBO 1				ESTRIBO 2			
	Apoyo 1	Apoyo 2	Apoyo 3	Apoyo 4	Apoyo 5	Apoyo 6	Apoyo 7	Apoyo 8
H lentas (Dilatación retracción, fluencia y temperatura) (T)	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08
H rápida (Frenada) (T)	3.44	3.44	3.44	3.44	3.44	3.44	3.44	3.44
H rápida (Centrífuga) (T)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H rápida (Viento s/c) (T)	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82
H rápida (Viento c/c) (T)	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45
H_r (T)	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08
$H_r + H_d$ (T)	4.65	4.65	4.65	4.65	4.65	4.65	4.65	4.65
f (coef. rozamiento)	0.25	0.29	0.29	0.25	0.25	0.29	0.29	0.25
Hmáx (T)	9.48	8.52	8.52	9.48	9.48	8.52	8.52	9.48
G (factor de forma)	7.81	7.81	7.81	7.81	7.81	7.81	7.81	7.81
δ_c (m)	0.0064	0.0064	0.0064	0.0064	0.0064	0.0064	0.0064	0.0064
$\delta_{q\,rotación}$ (m)	0.0113	0.0113	0.0113	0.0113	0.0113	0.0113	0.0113	0.0113
$\delta_{q\,rotación\,sup}$ (m)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
$\delta_{q\,rotación}$ (m)	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060
$\delta_c + \delta_q$ (m)	0.0181	0.0181	0.0181	0.0181	0.0181	0.0181	0.0181	0.0181
$\alpha_{a,s}$	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
$\alpha_{r,s}$	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
$\varepsilon_{c,q}$ deformación por cargas de diseño de compresión	2.6706	2.6242	2.6242	2.6706	2.6706	2.6242	2.6242	2.6706
$\varepsilon_{q,d}$ deformación cizalla por movimientos de traslación	0.5049	0.5049	0.5049	0.5049	0.5049	0.5049	0.5049	0.5049
$\varepsilon_{a,d}$ deformación por rotación angular de diseño	0.0217	0.0217	0.0217	0.0217	0.0217	0.0217	0.0217	0.0217
flecha vertical total, v_t (mm)	1.4804	1.4547	1.4547	1.4804	1.4804	1.4547	1.4547	1.4804

1) Comprobación de compresión máxima $(\sigma max/ab) < = \sigma_{adm}$	ok	ok	ok	ok	ok	ok	ok	ok
2) Comprobación de compresión mínima $(\sigma min/ab) > \sigma_{adm}$	ok	ok	ok	ok	ok	ok	ok	ok
3) Espesor de la placa de refuerzo	ok	ok	ok	ok	ok	ok	ok	ok
4) Deformación a cizalla $\varepsilon_{c,q}$ d cargas lentas)<0.5	ok	ok	ok	ok	ok	ok	ok	ok
$\varepsilon_{c,q} + \varepsilon_{a,d}$)<1	ok	ok	ok	ok	ok	ok	ok	ok
5) Deformación de diseño máxima, K_s = 1,5 $K_s[\varepsilon_{c,q} + \varepsilon_{a,d} + \varepsilon_{q,d}]<7$	ok	ok	ok	ok	ok	ok	ok	ok
6) Condición límite de rotación K_s = 3	ok	ok	ok	ok	ok	ok	ok	ok
7) Estabilidad a la torsión	ok	ok	ok	ok	ok	ok	ok	ok
8) Condición de no deslizamiento H <= Hmáx	ok	ok	ok	ok	ok	ok	ok	ok
9) Condición de estabilidad b>= Sen	ok	ok	ok	ok	ok	ok	ok	ok
entera/10	ok	ok	ok	ok	ok	ok	ok	ok
10) Factor de forma G >5	ok	ok	ok	ok	ok	ok	ok	ok

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

Ing. Antonio N. Pangrazio
Director de Fiscalizacion
innova Precast, S.L.

Ing. Rolando Ríos Tomboly
Director Pretec S.A.
PRETEC S.A.

ANEXO 9

Memoria de cálculo Puente 29 Caazapá Tramo Abai - Col. Margarita - Coord.: 608196 ; 7117447

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A

Ing. Antonio N. Pangrazio
Director de Fiscalización

Ministerio de OBRAS PÚBLICAS Y COMUNICACIONES

GOBIERNO NACIONAL

LLAMADO MOPC Nº 76/2019. SERVICIOS DE CONSULTORÍA PARA LA ADMINISTRACIÓN Y EJECUCIÓN DEL PROYECTO DE MEJORAMIENTO DE CAMINOS VECINALES Y PUENTES EN LA REGIÓN ORIENTAL (Financiación CAF-FONPLATA). CONTRATO S.G. MINISTRO Nº 18/2020. ECATEF."

Dic02 - Puente 29 - 2021

Tramo Abai - Col. Sta Margarita - Gaspar Cué

Puente 29

X	Y
608154	7117443

Memoria

Puente HºAº
L = 20 m

Diseño Final de Ingeniería

Departamento de CAAZAPA

CONCREMAT engenharia e tecnologia

CONSORCIO CONCREMAT - CIALPA

CIALPA

Noviembre 2020

Ing. Antonio N. Pangracio
Director de Fiscalización

Ing. Aníbal Troche
Apoyo Legal

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

Tabla de contenido

Contenido

TABLA DE CONTENIDO 2
1. ANTECEDENTES 3
2. UBICACIÓN 5
3. ESTUDIO TOPOGRÁFICO 6
4. ESTUDIO HIDROLÓGICO E HIDRÁULICO 8
5. ESTUDIO GEOLÓGICO - GEOTÉCNICO 35
6. ESTUDIO DE IMPACTO AMBIENTAL PRELIMINAR (EIAP) 60
7. ALTERNATIVA ELEGIDA 61
8. CÓMPUTOS Y PRESUPUESTO 62
9. ESPECIFICACIONES TÉCNICAS 64
A. ESPECIFICACIONES TECNICAS CONSTRUCTIVAS 64
B. ESPECIFICACIONES TECNICAS AMBIENTALES 64
10. ANEXO DE CÁLCULOS ESTRUCTURALES 65

Ing. Antonio N. Pengrazio
Director de Fiscalización

Alejandro Feldmann
Representante Legal
Constructora Feldmann S.A.

1. Antecedentes

El presente documento corresponde al Informe Final según el Pliego de Condiciones establecidas para la siguiente Llamado.

LLAMADO MOPC N° 76/2019. SERVICIOS DE CONSULTORÍA PARA LA ADMINISTRACIÓN Y EJECUCIÓN DEL PROYECTO DE MEJORAMIENTO DE CAMINOS VECINALES Y PUENTES EN LA REGIÓN ORIENTAL (Financiación CAF-FONPLATA). CONTRATO S.G. MINISTRO N° 18/2020. ECATEF."

Dic02 - Puente 29 - 2021

Tramo Tramo Abai - Col. Sta Margarita - Gaspar Cué

El Proyecto en síntesis conlleva los estudios topográficos, hidrológicos, geotécnicos, medioambientales, presupuestarios y de ingeniería en general para la Construcción de puentes o alcantarillas de hormigón armado que solucionen los problemas actuales de inundabilidad y por tanto falta de comunicación en los caminos existentes.

El Proyecto se realiza ante la necesidad de comunicación con zonas alejadas del país que se quedan incomunicadas con grandes lluvias y/o raudales.

El proyecto consiste en la sustitución de puentes de madera o de hormigón en mal estado que han pasado su vida útil por la implementación de puentes de hormigón armados, de manera a facilitar la integración departamental, mejorar las relaciones, de comunicación y acortar las distancias de viajes. También se espera que el proyecto favorezca las actividades económicas, el acceso a los servicios sociales y la generación de empleo rural no agrícola mediante el mejoramiento de los puentes existentes en áreas rurales de la Región Occidental.

Como Antecedentes al presente Informe se encuentran los siguientes hitos previos:

- El **06 de Julio de 2020** se observa dentro del Contrato de ECATEF del Consorcio la necesidad de realizar los diseños de ingeniería de puentes en diferentes Departamentos.

Ing. Antonio Pangrazio

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

- El **16 de Julio** se presenta el Cronograma de los trabajos como Informe Preliminar

- Este informe corresponde al Diseño Final de Ingeniería según los términos de referencia

- El **02 de Diciembre de 2020** se observa dentro del Contrato de ECATEF del Consorcio la necesidad de realizar el diseño en un puente del Camino en cuestión. Se remite por parte de la DCV del MOPC nota 3547/2020 sobre la necesidad de elaborar **el Diseño Fina de Ingeniería..**

- Este informe corresponde al Diseño Final de Ingeniería según los términos de referencia de 27 puentes realizados previamente en Diciembre 2020

Indicar que en documento independiente se ha presentado el EIAp de todos los puentes del Presente Contrato en donde estaba incluido este puente.

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

Ing. Aníbal Troche

Ing. Antonio M. Pangrazio
Director de Proyectos

2. UBICACIÓN

nº	Departamento	Tramo	Arroyo-Río	X	Y
29	CAAZAPA	Tramo Abai - Col. Sta Margarita - Gaspar Cué	A° Margarita (Aº Moroti ó Aº Capiibari)	608154	7117443

Longitud MOPC inicial	L topográfica	L calculada	Puente existente
6	12	20	Madera

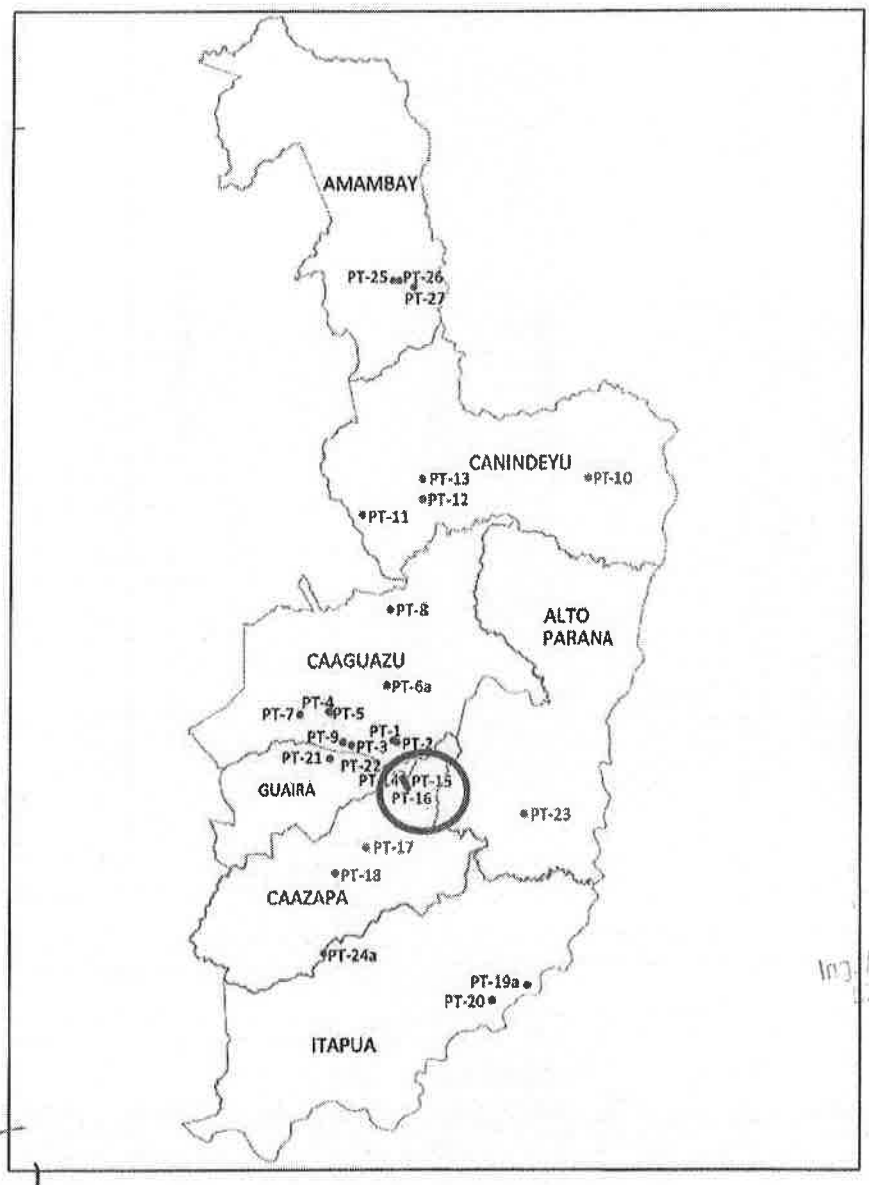


Figura 1: Mapa de Ubicación puente. Fuente: Elaboración propia.

Ing. Antonio N. Pangrazio

Ing. Amilcar Troche

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

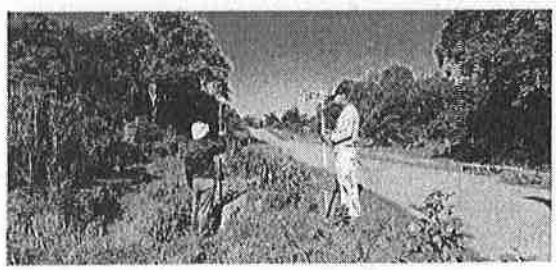
3. Estudio Topográfico

Se procedió al relevamiento previo planialtimétrico que permitirá a la Consultora discernir las diferentes alternativas a proponer y así diseñar las estructuras. Para cada cruce del contrato se realizó un relevamiento en detalle.

El relevamiento planialtimétrico se efectuó mediante la utilización de estación total con lectura directa al segundo de grado y equipos reflectores estabilizados manualmente.

En el **Anexo de Planos** de este informe se presentan los planos del levantamiento topográfico y en el **Anexo Digital - Anexo 1.1 Planillas de Topografía (en el Informe de Avance previo)** se entregaron los datos de las coordenadas obtenidas en la campaña de campo de los puentes. Se han relevado el total de los puentes en campo y se han procesado todos ellos obteniendo las planillas digitales y los planos de campo, con cota y código identificador del punto.

La metodología de obtención de datos de campo se basó en el emplazamiento de perfiles transversales a la traza del cauce. Posteriormente se levantaron los detalles circundantes por medio del levantamiento estratificado de los objetos territoriales significativos.



La metodología tiene en cuenta los TDr en relación a :"Los estudios topográficos deberán comprender como mínimo lo siguiente":

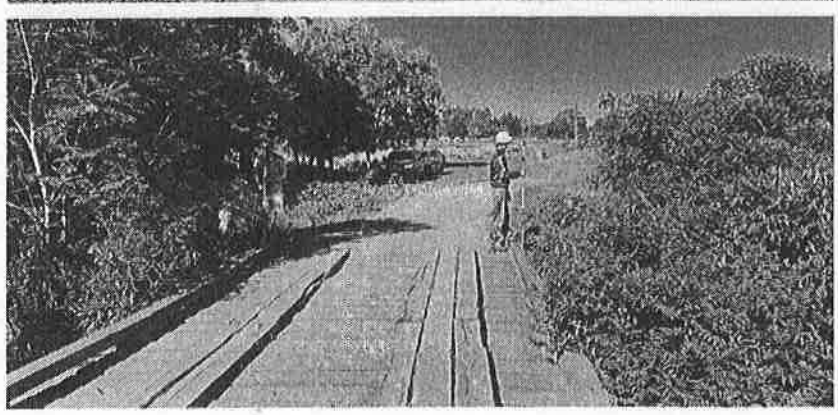
Levantamiento topográfico general de la zona del proyecto,	***Realizado el trabajo de campo y volcados los datos digitalmente***	***Ejecutado***
documentado en planos a escala entre 1:500 y 1:2000 con curvas de nivel a intervalos de 1 m	***Se presenta el procesado en el plano planialtimétrico***	***Ejecutado***
y comprendiendo por lo menos 100 m a cada lado del puente en dirección longitudinal (correspondiente al eje de la carretera) y en dirección transversal (la del río u otro obstáculo a ser transpuesto)"	***Así se tomaron los datos de campo y se pueden ver en las láminas.. En ocasiones las longitudes fueron mayores.***	***Ejecutado***

Ing. Antonio N. Pangrazio
Director de Fiscalización

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

En cada sitio se instalaron en campo mojones de amarre para el levantamiento del eje existente, la nivelación fue realizada con estación total con un barrido de secciones transversales cada 20 metros, 100 (cien) metros antes y después del cauce de agua a salvar, igualmente se realizó el levantamiento aguas arriba y aguas abajo con 7 secciones como mínimo en todos los casos, -100, -50, -20, 0, +20, +50 y +100 metros, donde no hay meandros, y mayor densidad de secciones cuando existen meandros.

También se tomaron las medidas de coordenadas con GPS de alta precisión de los sitios levantados.



Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

Ing. Antonio M. Pangrazio
Director de Fiscalización

4. Estudio Hidrológico e Hidráulico

LLAMADO MOPC Nº 76/2019

SERVICIOS DE CONSULTORÍA PARA LA ADMISTRACIÓN Y EJECUCIÓN DEL PROYECTO DE MEJORAMIENTO DE CAMINOS VECINALES Y PUENTES EN LA REGIÓN ORIENTAL

ESTUDIO HIDROLÓGICO Y

DIMENSIONAMIENTO HIDRÁULICO

Puente Dic 02: Arroyo Cabiibary Guasú

(Arroyo Margarita)

Abaí

Caazapá

Enero 2021

Ing. MSc. Alberto Grissetti

Registro Profesional M.O.P.C. N° 2224

Ing. Amilcar Troche

Ing. Antonio N. Pangrazio
Director de Fiscalización

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

Contenido

1. INTRODUCCIÓN 10

2. METODOLOGÍA EMPLEADA 10

2.1. Datos Utilizados 10
2.2. Actividades Realizadas 10

3. MODELO HIDROLÓGICO 11

3.1. Ubicación de la obra 11
3.2. Características de la Cuenca 11
3.3. Cálculo de la Infiltración 12
3.4. Tiempo de Concentración 15
3.5. Tiempo de Retorno y Precipitación de Diseño 16
3.6. Caudales de Diseño 19

4. MODELO HIDRÁULICO 21

4.1. Método utilizado 21
4.2. Secciones transversales 21
4.3. Condiciones de cálculo y parámetros hidráulicos 22
4.4. Salidas de la Simulación 25
4.5. Estudio de socavación 28

5. CONCLUSIONES 33

6. RECOMENDACIONES FINALES 33

Ing. Antonio N. Pingrazio
Director de Fiscalización

Alejandro Feldmann L.
Representante Legal
Constructora Feldmann S.A.

Ing. Aníbal Troche

1. INTRODUCCIÓN

El presente estudio tiene como objetivo la determinación de los caudales generados en cada cuenca y posterior dimensionamiento de puentes y/o alcantarillas. Para el análisis se utilizan modelos matemáticos de simulación hidrológica e hidráulica. Los cálculos se realizan de acuerdo al Manual de Carreteras del Paraguay (MOPC, 2019). El estudio se rige además por los criterios establecidos en el Manual de Drenagem de Rodovias, DNIT, Brasil.

2. METODOLOGÍA EMPLEADA

2.1. Datos Utilizados

Los modelos hidrológicos e hidráulicos requieren datos, tanto físicos como temporales, para representar adecuadamente el fenómeno modelado en el sitio de estudio. Se utilizaron los siguientes datos:

- Modelo Digital de Elevación (DEM), del satélite ALOS-PALSAR, con resolución espacial de 12.5m x 12.5m.
- Imágenes satelitales de Google Earth georreferenciadas.
- Mapas digitales de la DGEEC (vías, cauces) producidos en base a las ortofotocartas de 1994, del Servicio Nacional de Catastro, con resolución espacial de 0,30 metros.
- Curvas de nivel cada 10m de las ortofotocartas del vuelo 1994 (CEITE, 1997).
- Curvas IDF desarrollada por la Facultad de Ingeniería de la UNA / DINAC y actualizada al año 2009 por Cuevas-Rolón.
- Imágenes Satelitales del año 2017, del satélite LANDSAT 8, con resolución espacial de 30m x 30m.
- Relevamiento topográfico.

2.2. Actividades Realizadas

- Preparación de la cartografía base del área de estudio.
- Delimitación de cuencas, a partir del DEM. Definición de la red de drenajey determinación de datos geomorfológicos (pendiente, ancho, superficie, etc.)
- Definición del uso y tipo de suelo: Los mapas de uso de suelo se elaboran en base a información digital disponible.
- Cálculo del tiempo de concentración y definición de la precipitación de diseño, según la distribución temporal adoptada.
- Implementación del modelo hidrológico con el software HEC-HMS (USACE) para cálculos de caudales.
- Implementación del modelo hidráulico HEC-RAS (USACE) para dimensionamiento y verificación del puente.

Ing. Amilcar Troche

Alejandro Feldmann (Diez)
Representante Legal
Constructora Feldmann S.A.

Ing. Antonio N. Piangrazio
Director de Fiscalización